

WARM AIR HEATERS
fitted with low-NOx modulating
pre-mixed gas burners

AS COND **AS COND EX**



ACCORRONI
E. G.

**USE, INSTALLATION AND
MAINTENANCE MANUAL**

AS COND - AS COND EX

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VERY IMPORTANT NOTICE

This manual is an essential and integral part of the warm air heater and must always follow it. The user or the installer must read it carefully, before operating or handling the appliance.

The manufacturer may not be held liable for any damage to people, animals and property caused by:

- improper use of the appliance;
- unintended use of the appliance;
- any use of the appliance non compliant with the instructions of this manual;
- any use non compliant with European, national and regional laws, regulations and standards.

The manufacturer will accept no liability in the event that the heater is not installed, periodically checked or serviced by authorised service centres or qualified staff, i.e. "engineers with a specific technical knowledge about heating installations in inhabited buildings".

This appliance may not be used by people (including children) with reduced physical, sensing and mental capabilities or with insufficient experience and knowledge, unless they are monitored or instructed by a person responsible for their safety.

This manual is an integral part of the warm air heater, and therefore shall be maintained carefully and must always follow the appliance in the event of a change in ownership.

CAUTION! This warm air heater must not be used in explosive atmosphere.

The plant project, installation, start-up, periodical inspections and repairs of this warm air heater must be carried out only by skilled personnel.

In particular, all obligations provided for by European, national, regional and local laws, regulations, standards and recommendations applicable to design and installation, authorisations, periodical inspections, maintenance, combustion controls and emissions into the atmosphere shall be understood and complied with by the user and the said skilled personnel.

In case of troubles and faulty operation of the appliance, the user must disconnect power supply and avoid any attempt of repair, so as not to damage the appliance and/or third parties. See the description in the "Troubleshooting" paragraph of this manual.

CAUTION! Before maintenance or servicing, cut-off power supply to the appliance, by selecting turning the master switch to - O-.






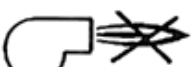
At the end of the heating season, the user must contact skilled personnel to have the combustion chamber and the heat exchanger cleaned, and (based on the intervals provided for by law) to check the performance of the other components and safety devices, by conducting a combustion test. The results of these operations shall be registered on the "heating plant handbook".

The air inlet filter, if any, must be cleaned at appropriate intervals. Remove it from its housing and blow compressed air or wash it (see the "Maintenance" paragraph).

The air inlet grille (6), when dirty, must be cleaned by a brush or an air-exhauster, without removing it.

Should the appliance be moved to another place, be sure this manual follows it, so that the new user and/or installer can consult it.

MEANING OF THE SYMBOLS USED ON THE ELECTRICAL BOARD/CONTROLS

Voltage	Heating	Ventilation only	Operation of the remote switch's thermal relays	Operation of the manual safety Limit	Burner off
					

GENERAL INFORMATION

The warm air heater is fit for the following applications:

a) **Direct heating of the air conveyed by a ventilating unit** The heat exchange occurs by contact between the external walls of the combustion chamber and the air.

b) **Ventilation only.**

To use it as according to (a), the heater shall be connected to the power line, the gas piping and a suitable combustion product/condensate drainage system.

To use it according to (b), simply connect it to the power line.

This warm air heater is to be used to heat the ambient air.

This appliance must not be used for other purposes and, in particular, at an average outlet air temperature over 80°C, during normal operation.

CAUTION! The manufacturer is liable for the operating characteristics of the heater providing that it is used according to the instructions and subject to the limits described throughout this manual.

Warranty

If the heater is not installed according to this manual, the warranty will become null and void.

STRUCTURAL INSPECTION AND SAFETY REQUIREMENTS

The warm air heater is made of an aluminium frame and an external panelling in pre-painted sheet: the panels' interior is insulated by a glass wool mattress. The heating section includes a combustion chamber and a heat exchanger. In this area the insulating mattress is protected from overheating by galvanized steel sheet. The ventilating section, with a centrifugal fan, driven by a single-phase or three-phase belt-drive electric motor, is coupled with the heating section.

The ventilating unit is provided with a finger protection grille, that can be removed only by means of a tool. The combustion chamber, made of stainless steel for high temperatures, is bolted to the frame, so that its thermal expansion does not affect its life over the time. The heat exchanger, made of stainless steel pipes, is welded to the combustion chamber. Inspection and maintenance operations may be carried out through large openings on both sides.

On the front of the heater you can find: a pre-mixed gas burner (with gas ramp), the modulation kit connected to an air temperature sensor and an electrical control board with:

- Master switch - HEATING – BURNER STOP – VENTILATION switch

- Voltage signal lamp – Signal lamp for remote switch's thermal relays – Safety Limit signal lamp;

a tri-thermostat consisting of 3 thermostats, which perform the following control and safety functions (located on the top, above the heat exchanger):

- **FAN (TR):** thermostat normally opened, to automatically start and stop the ventilating unit during the "HEATING" phase

- **LIMIT (TW):** normally closed, automatic reset max. temp. thermostat for the burner, which stops the burner automatically, to make sure that the temperature of the air leaving the heater does not exceed the safety limit.

- **LIMIT2 (STB):** normally closed, automatic reset safety thermostat for the burner, which stops the burner automatically, to make sure that the temperature of the air leaving the heater does not exceed the safety limit set by the reference standard. It is calibrated at 100 C° by the manufacturer; these limit must never be modified, to prevent dangerous overheating (to reset the burner, see the instructions on Chapter TRE-THERMOSTAT).

OTHER ESSENTIAL SAFETY REQUIREMENTS

Electrical equipment. All warm air heaters are checked for conformity as follows:

- Visual inspection on the electric circuit, and connection tightening
- Check the grounding continuity
- Insulation resistance test
- Voltage test

Temperatures. The temperatures of accessible zones, for the manual use of the warm air heater, are in compliance with the reference European standard.

Noise. Appropriate measures have been adopted to minimize noise emissions. The relevant values (in db(A)) are listed in the table on table DATA SHEET.

Signals. The signals on controls and alarm devices consist of symbols based on ISO7000. These symbols are explained on Chapter MEANING OF THE SYMBOLS.

WARM AIR HEATER DATA PLATE

A data plate (made with an ultra destructible film, which, once removed, cannot be used again) is affixed on the front of each warm air heater, and shows its technical characteristics.

A facsimile of this plate is shown here below.

GENERATORE D'ARIA CALDA A CONVEZIONE FORZATA CON BRUCIATORE A GAS PREMISCELATO BASSO NOX CL 5		
FORCED CONVECTION WARM AIR HEATER WITH GAS PREMIX BURNER LOW NOX CL 5		
GENERATEUR D'AIR CHAUD A CONVECTION FORCEE AVEC BRULEUR GAZ PREMIX LOW NOX CL 5		
MOD. TYP. AS COND 65	N° 101001 9121235-2	MESE/ANNO MONTH/YEAR MOIS/ANNEE 02-2010
PORTATA TERMICA NOMINALE NOMINAL HEAT INPUT DEBIT CALORIFIQUE NOMINAL		76 kW
POTENZA TERMICA NOMINALE PUISSANCE CALORIFIQUE UTILE THERMAL RATED POWER		73 kW
RESA TERMICA ALLA Pn		96,1 %
PORTATA ARIA AIR DELIVERY DEBIT AIR		6.100 mc/h
PRESSIONE STATICA UTILE AVAILABLE AIR PRESSURE PRESSION AIR DISPONIBLE		Pa
POTENZA ELETTRICA ASSORBITA RATED POWER INPUT PUISSANCE ELECTRIQUE ABSOR.		n° 1x 0,736 kW
TENSIONE - TENSION		230/1F/50HZ
PAESE DESTINAZIONE COUNTRY OF DESTINATION PAYS DE DESTINATION	IT	CATEGORIA CATEGORY CATEGORIE II₂H3B/P
MADE IN ITALY PIN 0694BU1913		CE 0694
GRADO DI PROTEZIONE PROTECTION LEVEL PROTECTION DEGREE	IP X5D	CONFIG. TIPO CONFIG. TYPE CONFIG. TYPE B23, C13, C33, C53

PACKAGING

The warm air heater is delivered on a pallet, and is protected by a pluribol film. The air inlet plenum, if installed, is packaged together with heater or separately, according to the models.

TRANSPORT, LOADING AND UNLOADING

Transport, loading and unloading must be carried out carefully, to prevent damage to the appliance, as well as to people, animals and property.

To load and unload the appliance, use a lift truck of suitable capacity, according to the safety factor (see the gross weight of the appliance in the table on Chapter WEIGHT AND DIMENSIONS). During these operations, the centre of gravity of the appliance must remain in the middle, without dangerous inclinations.

After removing the packaging, check the condition of the appliance. If in doubt, contact the manufacturer or its agent. The heater is a compact appliance, with its electrical board and the burner.

PACKAGING MATERIALS

Packaging materials (wood, cardboard, polystyrene, nails etc.) shall be collected and disposed of according to the laws in force.

CAUTION! Don't leave these materials within the reach of children, because they may be a source of danger.



Generator series "AS COND EX" packaged

POSITIONING

After removing its packaging, the heater must be positioned as described on page 17.

CAUTION! Don't turn the heater upside-down

INSPECTIONS BEFORE START-UP

The heater is equipped with an electrical board, which comprises:

- A master switch
- A HEATING – BURNER STOP – VENTILATION switch
- A terminal board
- Three signal lamps on the board's door indicate:
 1. VOLTAGE: the board is powered
 2. THERMAL RELAYS ON: the remote switch's thermal relays have de-energized the fan. From mod. "X80" to mod. "X300" only.
 3. LIMIT2 ENABLED:: the safety Limit has de-energized the burner.

Check that:

- the electrical board is properly connected to the single-phase power line (for models "50" and "65"; three-phase from mod. "80" to mod. "300") and that the main power cable has a suitable section for Ampere absorption
- the rotation direction of the fan(s) is the one shown on the impeller (figure 13)
- the calibration of the remote switch's thermal relays is correct (from mod. "80" to mod. "300"): the relevant values (In Amperes) are shown on Chapter DATA SHEET.
- there are no obstacles on the delivery and on the recovery nozzle, which could obstruct air circulation
- the fins of the air delivery nozzles, if any, are not too inclined, so as not to reduce their capacity
- the air inlet filters are clean, not to reduce the air capacity.

OTHER INSPECTIONS IN THE HEATING PHASE

Check that:

1. The fuel supply pipe to the burner is compliant with the Standards in force. Ask the piping installer to issue the certificate of the gas supply system, as well as the final test certificate
2. The burner is supplied with the type of gas for which it has been designed
3. The calibration of the FAN, LIMIT and LIMIT2 thermostats is correct (see Chapter TRE-THERMOSTAT
4. The flue system is compliant (see the provisions/regulations applicable to flues), as well as the combustion air piping, if any
5. The environment ensures enough ventilation and combustion air, according to the standards in force.
6. The condensate disposal piping it has been installed according to the norms (see Chapter CONNECTING THE CONDENSATE DRAIN

Note. Carefully read the manual of the burner supplied by the manufacturer

OPERATION DESCRIPTION

Heating phase. The master switch on the electrical board must be in the -1- position, and the change-over switch in the -HEATING- position. Whenever the room thermostat requires heating, the burner begins its self-test and pre-wash cycle, which is followed by combustion. Within approximately 5 minutes from the beginning of the combustion, the FAN thermostat starts the ventilating unit automatically. When the burner is turned off by the room thermostat, the ventilating unit remains on in order to cool the heat exchanger, and is turned off automatically by the FAN, to prevent cold air supply.

The burner can be stopped also by the LIMIT (the burner's max. temp. thermostat), calibrated at 80°C, if the temperature of the air leaving the heater exceeds this temperature limit. The LIMIT resets the burner automatically, once the air has cooled. The burner can be stopped also by the LIMIT2 (the burner's safety thermostat), calibrated at 100°C, if the temperature of the air leaving the heater exceeds the safety limit set by the applicable standard.

To reset the burner, let the air cool down and then proceed as specified on chapter TRI-THERMOSTAT of this manual.

CAUTION! The LIMIT2 activation detects an operational fault; please contact an authorised after-sale service or qualified technical personnel.

STOP

If the switch is moved to the -BURNER STOP- position, the burner stops, while the ventilating units continues to turn, up until it is turned off by the FAN thermostat (on completion of the cooling phase). to de-energize the heater, move the master switch (IG) to position -O-.

CAUTION! Before disconnecting power supply (with the master switch), make sure that the heater has cooled down; otherwise the appliance life could be shorter.

Ventilation phase. Turn the switch to the -VENTILATION- position: the heater will work as fan only, and the burner will be cut off.

CAUTION! Never turn off the heater using the master switch; use its own switch, the room thermostat or the clock, if installed: otherwise, the heat exchanger is likely to be still heated and could be strained.

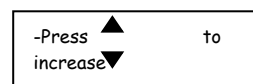
MODULATION REGULATOR CAREL TYPE CLIMA (read his instructions supplied with the heater)

The burner, of modulating type, is controlled (during flame modulation phases) by the ambient terminal device type "Clima", supplied with the heater, with an air sensor NTC in it. The "Clima" **is to be installed in the room to be heated**. To set the ambient temperature for the modulation read here down:

OUTSIDE TEMPERATURE'S PROBE



Option on request

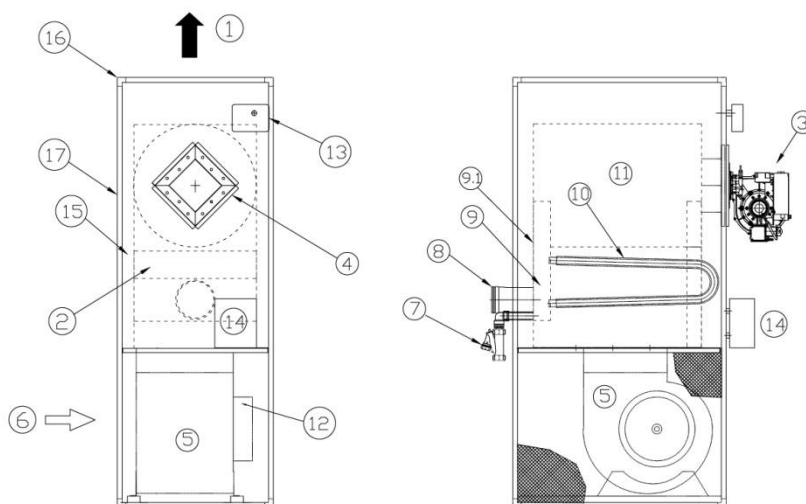


The "Clima" device operates on the burner as modulation control, room thermostat, clock thermostat.

For example: when we set 20°C, the modulating starts on at 18°C and the burner will be turned off just when it will reach 20°C. The burner will start anew at 19,5°C. The regulator CLIMA is powered with 24V, so the electric board contains the transformer of 230V-24V. The regulator send a signal of 0-10V for flame modulation. The communication cable 0-10V between Clima and burner could have the max distance of 10 m with section 0,5 mm², or just max 30 mt with concealed cable with section 1,5 mm².

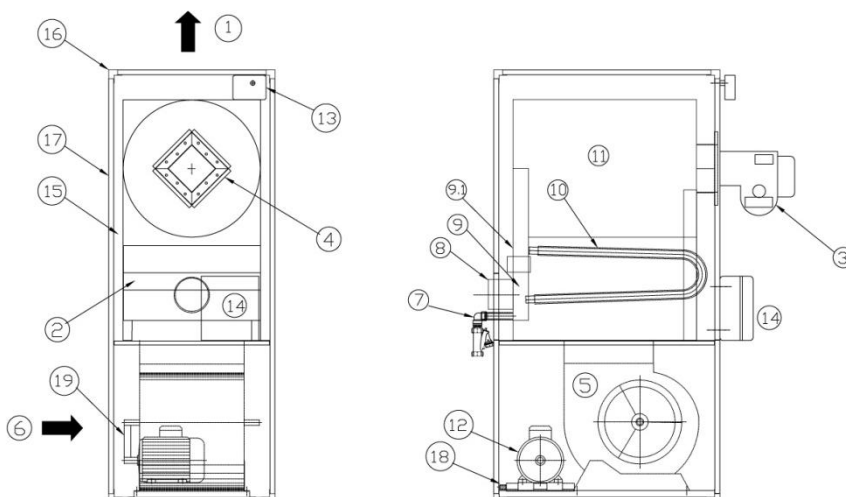
COMPOSITION OF THE "AS COND" SERIES HEATER, Models from "50" to "65", with single-phase motor, directly coupled to the fan

- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels.



Models from "80" to "200", three-phase, with fan's drive motor

- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Pulleys and drive belts



Note: for 80/100 the burner has a protection (see item 15 mod. 50/65)

Models from "250" to "300" three-phase, with fan's drive motor

- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Pulleys and drive belts

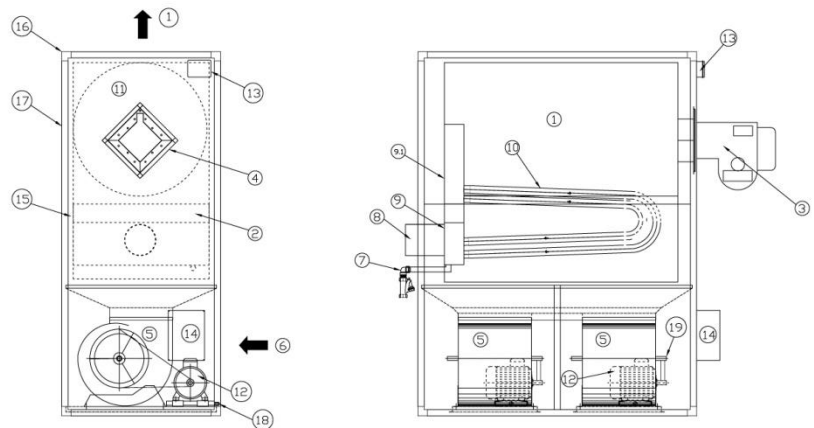
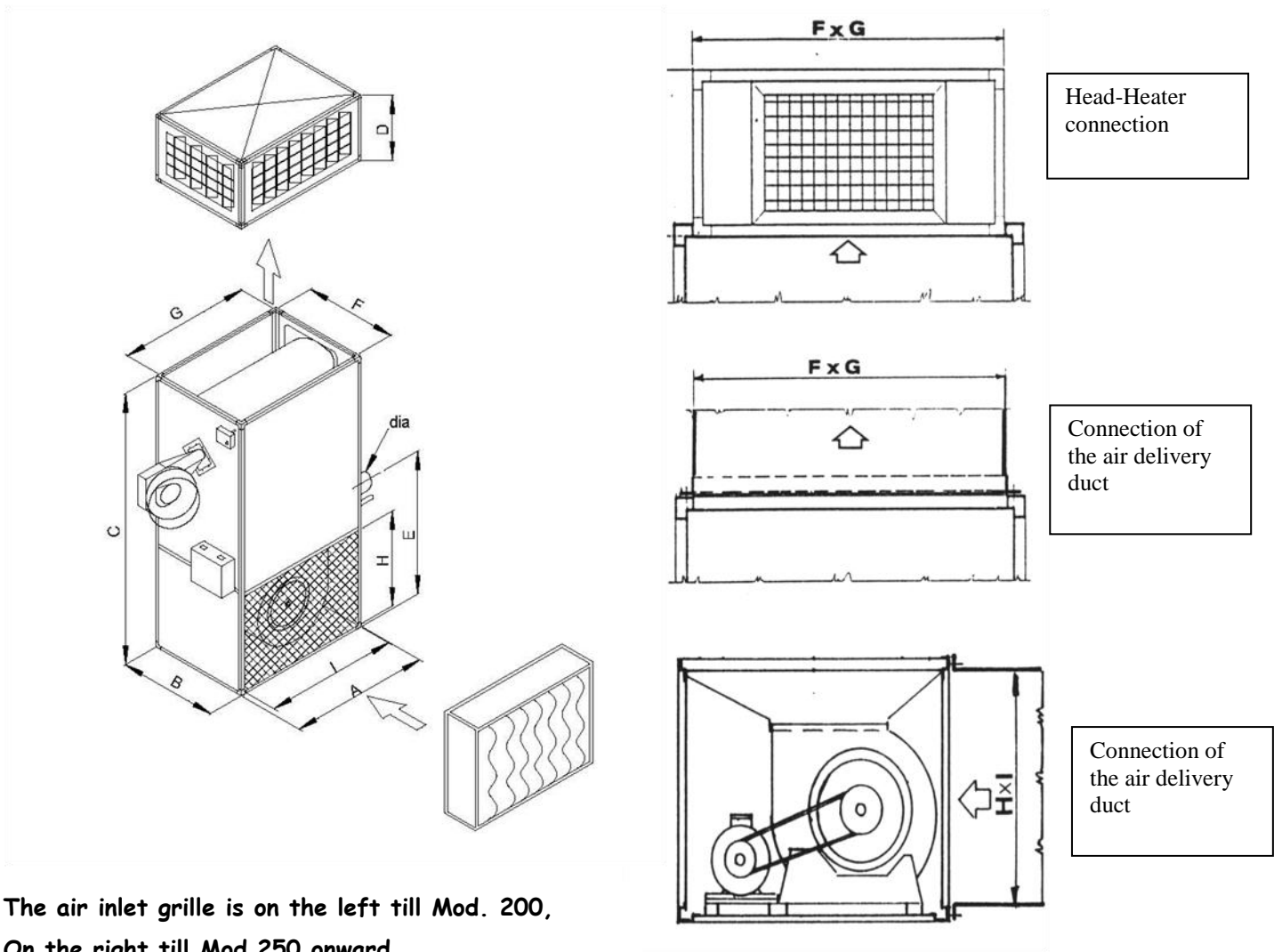


Fig 1 Warm air heater 1Ph with air recovery duct and head-heater and warm air heater 3Ph with heatd-heater.

WEIGHTS and DIMENSIONS "ASCOND" SERIES

Weight in [kg] and dimensions in [mm].



The air inlet grille is on the left till Mod. 200,
On the right till Mod.250 onward
The grille position can be reversed.

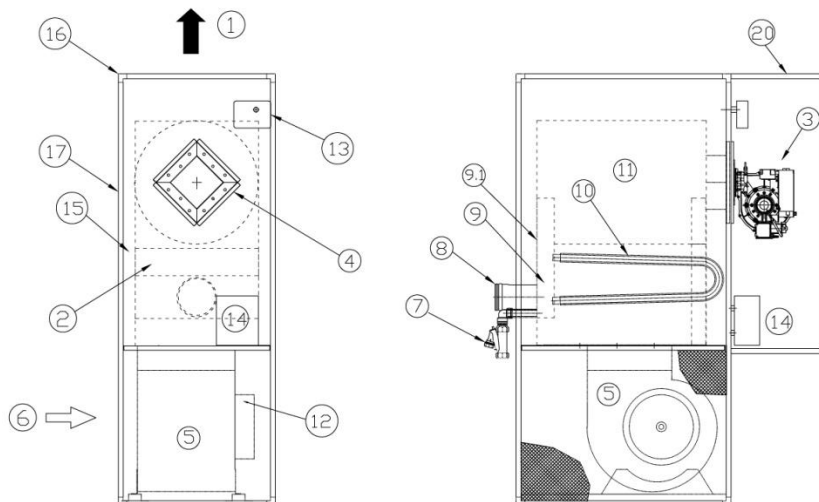
MOD.	HEATER			Head height	Flue height	Air Outlet-Inlet connection		Air Inlet connection		Frame profile	Flue system	Weight (1)		Net head weight
	Lenght	Width	Height									net	packed	
	A	B	C			F	G	H	I	L	Ø	Kg	Kg	
50	870	636	1750	305	860	596	830	630	830	20	100	165	175	17
65	870	636	1750	305	860	596	830	630	830	20	100	170	180	17
80	1020	750	1950	405	935	670	940	690	940	40	130	270	282	27
100	1020	750	1950	405	935	670	940	690	940	40	130	275	287	27
150	1440	1020	2340	405	1070	940	1360	760	1360	40	150	435	450	42
175	1440	1020	2340	405	1070	940	1360	760	1360	40	150	440	455	42
200	1440	1020	2340	405	1070	940	1360	760	1360	40	150	445	460	42
250	1790	1020	2340	405	1130	940	1710	760	1710	40	200	570	590	50
300	1790	1020	2340	405	1130	940	1710	760	1710	40	200	580	600	50

1) complete with burner and gas ramp

COMPOSITION OF THE "AS COND EX" SERIES HEATER

Models from "50" to "65", three-phase, with fan's drive motor

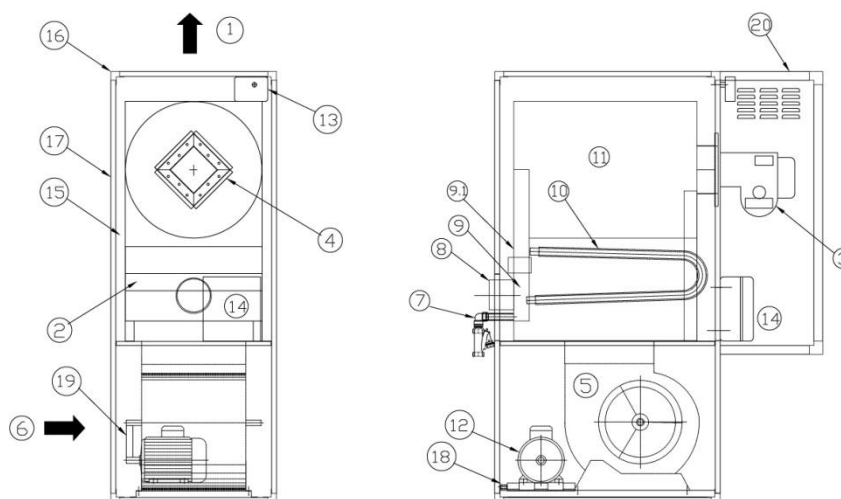
- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels.



- 20) Booth protecting burner and electric components

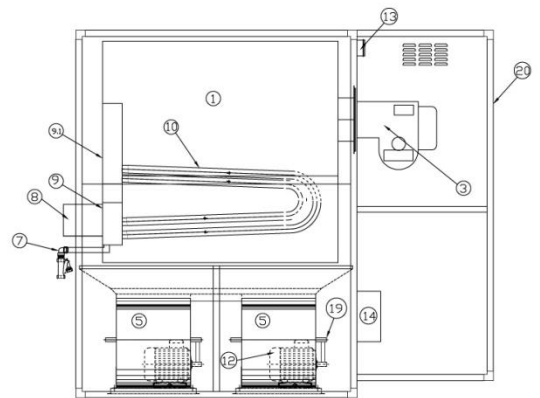
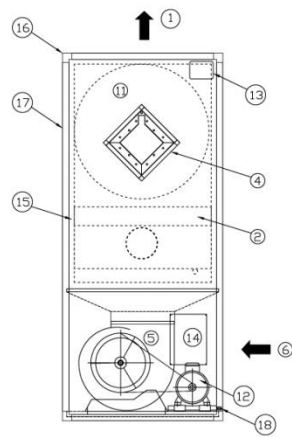
Models from "80" to "200", three-phase, with fan's drive motor

- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Pulleys and drive belts
- 20) Booth protecting burner and electric components



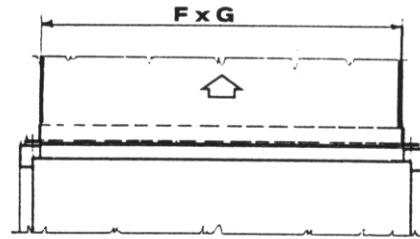
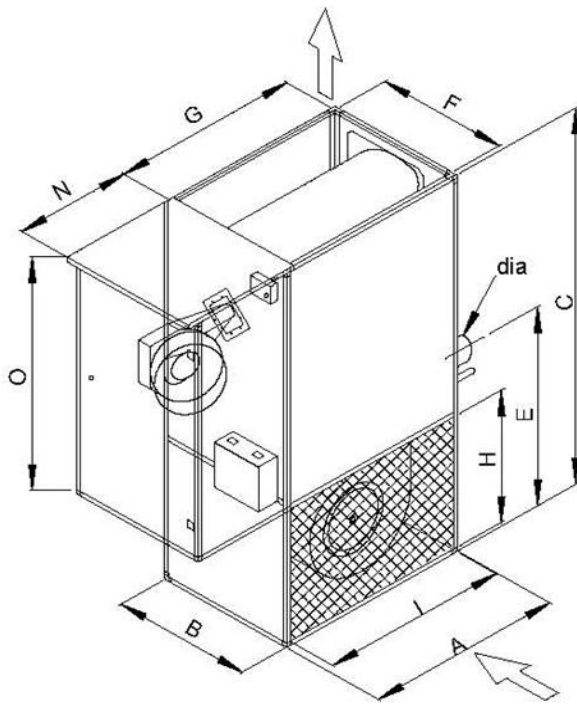
Models from "250" to "300", three-phase, with fan's drive motor

- 1) Air outlet
- 2) Fume box door
- 3) Burner
- 4) Burner anchor plate
- 5) Centrifugal fan
- 6) Air inlet grille
- 7) Condensate drain
- 8) Stack connection
- 9) Rear fume box
- 9.1) Front fume box
- 10) Heat exchanger
- 11) Combustion chamber
- 12) Fan motor
- 13) Fan-Limit-Limit2
- 14) Electrical board
- 15) Air baffles
- 16) Frame made of aluminium sections
- 17) External insulated panels
- 18) Motor's belt tightening slide
- 19) Pulleys and drive belts
- 20) Booth protecting burner and electric components

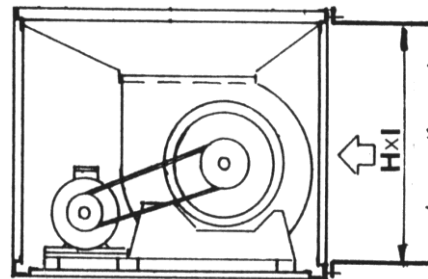


WEIGHTS and DIMENSIONS "AS COND EX" SERIES

Weight on [kg] and dimensions on [mm].



Head-Heater
connection



Connection
of the air
recovery
duct

The air inlet grille is on the left till Mod. 200,
On the right till Mod.250 onward
The grille position can be reversed.

MOD.	HEATER			Flue exhaust connection	Air delivery connection		Air inlet connection		Burner cabin		Flue exhaust	Heater weight	
	Length	Width	Height						Depth	Height		net	packed
	A	B	C		F	G	H	I	N	O		Kg	Kg
50	870	636	1750	860	596	830	630	830	400	1100	100	187	197
65	870	636	1750	860	596	830	630	830	400	1100	100	192	202
80	1020	750	1950	935	670	940	690	940	400	1220	130	295	307
100	1020	750	1950	935	670	940	690	940	400	1220	130	300	312
150	1440	1020	2340	1070	940	1360	760	1360	650	1540	150	479	494
175	1440	1020	2340	1070	940	1360	760	1360	650	1540	150	484	499
200	1440	1020	2340	1070	940	1360	760	1360	650	1540	150	489	504
250	1790	1020	2340	1130	940	1710	760	1710	800	2170	200	615	635
300	1790	1020	2340	1130	940	1710	760	1710	800	2170	200	625	645

1) complete with burner and gas ramp

PLENUM - STANDARD HEAD FOR DIRECT AIR DELIVER

WARM AIR HEATERS OF THE "AS COND" SERIES

Air blown by the nozzles on three sides, and dimensions in mm

MOD.	P	Q	D	R	T	S	No. of nozzles 1)	Air blown in m.	
								max 2)	min
50	825	591	305	300	300	200	1+1+1	16	16
65	825	591	305	300	300	200	1+1+1	16	16
80	935	665	405	550	550	300	1+1+1	34	34
100	935	665	405	550	550	300	1+1+1	38	38
150	1355	935	405	750	750	300	1+1+1	55	55
175	1355	935	405	750	750	300	1+1+1	60	60
200	1355	935	405	750	750	300	1+1+1	63	63
250	1355	935	405	750	750	300	1+2+1	74	60
300	1355	935	405	750	750	300	1+2+1	80	62

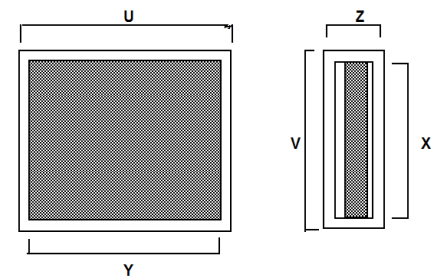
1) Short side (Q) + long side (P) + short side (Q).
2) The final speed of the blown air is 0.15 m/sec, and the nozzle fins' deflection is 0°. If deflection = 30°, multiply the blown air value by 0.65.

Note: $T \times S / R \times S$ = DIMENSIONS OF A SINGLE NOZZLE

FILTER BOXES ON AIR INLET DELIVERY – WARM AIR HEATERS OF THE "AS COND" and "AS COND EX" SERIES

Filters' pressure drops and dimensions in mm

MOD.	U	V	Z	Y	X	Filters (1)	Pressure drop [Pa] (2)
50	870	620	60	830	580	1x810x640x48	70
50 EX						2x400x500x48	106
65	870	620	60	830	580	1x810x640x48	93
65 EX						2x500x400x48	105
80	980	680	60	940	630	1x910x695x48	97
80 EX						1x625x500x48 1x625x400x48	113
100	980	680	60	940	630	1x910x695x48	125
100 EX						1x625x500x48 1x625x400x48	145
150	1440	840	200	1400	800	4x625x400x98	109
150 EX						2x625x500x98 1x625x400x98	80
175	1440	840	200	1400	800	4x625x400x98	141
175 EX						2x625x500x98 1x625x400x98	103
200	1440	840	200	1400	800	4x625x400x98	165
200 EX						2x625x500x98 1x625x400x98	121
250	1790	840	200	1750	800	2x625x400x98 4x500x400x98	141
300	1790	840	200	1750	800	2x625x400x98 4x500x400x98	170
<p>1) Efficiency ASHRAE52/76 DUST WEIGHT: 87%</p> <p>2) Pressure drop of a new filter. CAUTION! For plant calculations, this pressure drop for rather dirty (but not clogged) filters must be increased by at least 50%, and must be subtracted from the useful head of the heater.</p>							



DATA SHEET series: "AS COND" "AS COND EX"

Thermal Performance	Mod.	50	65	80	100	150	175	200	250	300
Rated heat input Qn	kW	61,1	76	98,5	122	179	203	238	270	313
Rated heat rating Pn	kW	59,8	73,0	96,3	116,6	178,6	201,8	234,2	269	310
Thermal efficiency at rated thermal power Pn	%	97,9	96,1	97,8	95,6	99,8	99,4	98,4	99,3	98,7
Heat input at 50% of the rated heat input	kW	30,55	38	49,25	61	89,5	101,5	119	162	187,8
Heat rating at 50% of the rated heat input	kW	31,8	39,0	51,6	62,1	93,8	106,0	123,6	167,3	191,3
Thermal efficiency at 50% of the rated heat input	%	104,2	102,6	104,9	101,8	104,8	104,5	103,9	103,3	101,8
Minimum heat input Qmin	kW	22	22	31	31	53	53	53	88	102
Heat rating at Qmin	kW	23,3	23,3	33,4	33,4	56,65	56,65	56,65	94,51	109
Thermal efficiency at minimum heat input Qmin	%	106	106	107,8	107,8	106,9	106,9	106,9	107,4	106,9
Backpressure in the combustion chamber, with G20 at Qn	mbar	4,3	7,5	3,4	5,1	3,9	5,2	6,2	4	4,8
Backpressure in the combustion chamber, with G30 at Qn	mbar	4	7,4	3,1	4,7	3,7	5	5,9	3,8	4,6
Condensate produced when the room temperature is 20°C	l/h	2,15	2,15	4,06	4,06	4,5	4,5	4,5	5,52	5,2
AERAULIC PERFORMANCE										
Air flow rate at 18 °C	mc/h	4700	6100	7560	9200	13000	15800	18000	20800	24000
Useful static pressure	Pa	150	150	150	150	200	200	200	200	200
DELTA T AIR at PN °C	°C	37,4	35,1	37,2	37,2	40,4	37,6	38,3	37,1	37
MAX GAS CONSUMPTION AT 15°C-1013 mba										
METHANE G20 at 20 mbar	mc/h	6,47	8,04	10,42	12,91	18,94	21,48	25,19	28,57	33,12
NAT. GAS G25 at 25 mbar	mc/h	7,52	9,4	12,1	15,0	22,0	25,0	29,3	33,24	38,53
PROPANE G31 at 37 mbar	Kg/h	4,75	5,90	7,65	9,48	13,91	15,77	18,49	20,98	24,32
BUTANE G30 at 28 mbar	Kg/h	4,82	5,99	7,77	9,62	14,12	16,01	18,77	21,29	24,68
CO2 at Qn with G20 (tolerance ± 0.2)	%	8,7	8,9	8,9	8,9	8,8	8,7	8,7	8,3	8,3
CO2 at Qn with G31 (tolerance ± 0.2)	%	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10	10
NOx (≤50 Mg/kWh)	CL	Classe 5								
ELECTRICAL DATA										
Fan motor capacity	KW x n.	0,736	0,736	1,5	2,2	3	4	5,5	3x2	4 x 2
Fan motor supply voltage	V-Ph-Hz	230 V - 1 - 50			400 V - 3+N - 50					
Fan motor absorption	A	7,7	7,7	3,6	5,1	7	9,2	12	7 x 2	9,2 x 2
Fan motor absorption/voltage 3F230V 50Hz	A			6,2	9,3	12	15	20	12 x 2	15 x 2
Sound pressure (at 5 m)	dB(A)	70	72	72	73	71	73	74	74	75
Protection degree of "XE" "XEO" "XR" versions	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D
ELECTRICAL DATA, WITH USEFUL PRESSURE = 300 Pa										
Fan motor capacity	kW	1,1	1,5	2,2	3	4	5,5	7,5	3 x 2	5,5 x 2
Fan motor supply voltage	V-Ph-Hz	400 V - 3+N - 50								
Fan motor absorption/voltage 3F400V 50Hz	A	2,9	3,6	5,1	7	9,2	12	17,8	7 x 2	9,2 x 2
Fan motor absorption/voltage 3F230V 50Hz	A	4,8	6,2	9,3	12	15	20	31	12 x 2	15 x 2
Flue connection/combustion air intake	Ø	100/100		130/130		150/150			200/200	
GAS CATEGORY	IT	II 2H3B/P								
Type of appliance, based on exhaust devices/combustion air intake	tipo	B23 – C13 – C33 – C53								
Warm air heaters can be used together with RIELLO burner	RIELLO	RX80 S/PV	RX80 S/PV	RX100S/ PV	RX120 S/PV	RX250 S/PV	RX250 S/PV	RX250 S/PV	RX350 S/P	RX350 S/P

INSTALLING THE WARM AIR HEATER AND ITS ACCESSORIES

IMPORTANT! This part of the manual is intended for the installer or qualified personnel.

HEATER LOCATION AND CLEARANCE

The warm air heater must be installed according to the provisions of the Ministerial Decree dated 12 April 1996 and of other regulations and standards, as applicable, of which the installer must be aware.

Ventilate the room where the warm air heater is installed according to the provisions of the laws, regulations and standards referenced above.

- Try to cover all the heated area with the blown air
- In the presence of considerable air infiltration (e.g. from doors), adjust the air flow
- Do not direct the air flows against obstacles, such as pillars and stored material
- If the room is provided with air extractors, install the warm air heater on the opposite wall, as well as an outside air intake, in order to supply new air.

HEATER LOCATION

Leave an appropriate clearance around the heater, free of combustible material, and calculate the distance in compliance with the M.D. dated 12 April 1996.

HEATER DISTANCE FROM WALLS

To calculate the minimum distance of the heater from walls and ceiling, refer to the M.D. dated 12 April 1996 and other regulations in force. The minimum distances recommended by the manufacturer for maintenance of heater, burner and accessories, if any, are indicated below.

MOD.	A [mm]	B (1) [mm]	C [mm]
50	1000	700	300
65	1000	700	300
80	1000	820	300
100	1000	820	300
150	1300	820	600
175	1300	820	600
200	1300	820	600
250	1300	820	600
300	1300	820	600

Check this height based on the possibility of disassembling and servicing the flue system.

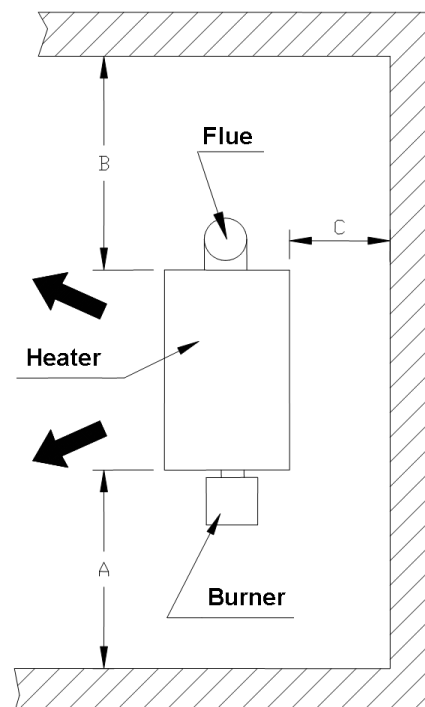


Fig 4 Minimum distance of the heater from walls and ceiling scheme

INSTALLATION

The warm air heater must be installed by skilled personnel, qualified pursuant to law. The warm air heater must be installed according to national and local regulations.

TEMPERATURES

The operating temperatures of burner and electric components are:
minimum 0°C; maximum 60°C.

In the case of "EX" versions installed outdoor, at operating temperatures below 0°C, CMT recommends an anti-frost kit, mounted in the burner booth on demand. This kit maintains the temperature inside the burner booth at 0°C when the outdoor temperature drops below this limit.

BURNER

The warm air heater is supplied together with a modulating pre-mixed gas burner (series RX), complete with gas ramp, modulating kit and modulating air sensor: all these elements can form a complete heating unit. The burner is assembled, wired to the warm air heater and the tri-thermostat, adjusted and tested.

Anyway, during the first start-up and periodical inspections, check that combustion parameters are the ones shown in the technical data table on Chapter DATA SHEET.

If the appliance has to be re-adjusted (for example if the burner is replaced), this operation must be performed by a qualified engineer, according to the instructions provided in the RX burner manual, delivered together with the heater.

NOTE: the CO value should range between 0 and 20 ppm



GAS PIPE

The gas pipe must be manufactured to reference UNI-CIG or Country standards. Pipe diameters must be calculated according to the heater capacity and distance from the meter, and sized so that the total pressure drop between the meter and any heater does not exceed 1 mbar (methane) and 2 mbar (LPG). The reference UNI-CIG standards illustrate the diameter tables, based on capacity and length.

Install a valve and a gas filter near the heater. For methane, make sure that the meter can deliver the gas volume required. For propane, install a two-stage pressure reducing system: install a first stage reducer close to the tank (calibrated at 1.5 bar) and a second stage reducer before the internal piping.

GAS SHUT-OFF AND ALARM DEVICE

The warm air heater must be provided with a gas shut-off and alarm device to detect any gas leak, in compliance with national/local laws and regulations in force.

ELECTRICAL CONNECTIONS

(see wiring diagrams on chapter ELECTRIC DIAGRAM)

Electrical connections must comply with national and local regulations and standards (IEE standards included). This heater is delivered complete with all electrical connections, except for connection to power supply and remote control or room thermostat, to be carried out by the installer, based on the wiring diagram on Chapter ELECTRIC DIAGRAM of this manual.

Do not de-energize the heater using the master switch.

- During installation, make sure the heater is isolated from the mains supply, by means of a dedicated omnipolar switch (min. space for contact opening: 3 mm), installed upstream of the heater, of suitable size, based on the heater's total electric load and in compliance with current standards. The main power cables must be of suitable size and T marked. The ground cable must be longer than the others (by approx. 2 cm). The heater's supply voltage must be 1F 230Vac (**50 and 65**) and 3F 400V+N 50Hz (**80 to 200**). The heater must be grounded according to the standards in force.
- Connect the fire damper (if installed) to the heater's electrical board. When installing the room thermostat:
 - Install it in a room heated by the warm air heater. Do not leave it under direct sunlight. Do not install it on a cold wall, but rather on an internal wall. Do not install it in a place directly blown by the air jet.



CAUTION! Do not connect the timer, if installed, in series with the mains supply; connect it to the room thermostat's line. Otherwise, the timer would turn off the heater, and all the unused heat would remain in the appliance (which could be damaged)

CONNECTION OF THE FLUE TO THE STACK

If requested by local regulations, or when other options are selected, the warm air heater must be connected to a stack of proper sized, made of suitable materials and installed according to national and local environmental regulations and standards. The diameter of the pipe connecting the heater to the stack must be equal to or larger than the flue; all joints must be sealed. When dimensioning the ducts/stack system, please remember that the maximum pressure drop must not exceed 50 Pa.

FLUE/COMBUSTION AIR INTAKE

The warm air heaters of the X series are fit for the following flue/combustion air intake systems: B23 and of tight type, C13, C33, C53, C63.

Please consult national and local regulations and standards, to make sure that the desired system can be installed.

Comply with the installation diagrams provided throughout this manual. The sum of maximum pressure drops between the flue and the combustion air intake (if installed), including terminals, must not exceed 50 Pa.

For more information about duct joints, please contact A2B Accorroni directly or your supplier.

The table on the next page shows the pressure drops in the pipes, flue/combustion air intake for a variety of models and diameters, supplied by A2B Accorroni. These pipes and elements are made of smooth stainless steel.

A2B Accorroni warrants the heater performance if its own pipes and elements are mounted (as specified in the table **FLUE AND COMBUSTION AIR INTAKE ELEMENTS**). The installer can use pipes and elements manufactured by other companies, providing that pressure drops do not exceed the ones shown in the table

PRESSURE DROPS IN PIPES AND ELEMENTS.



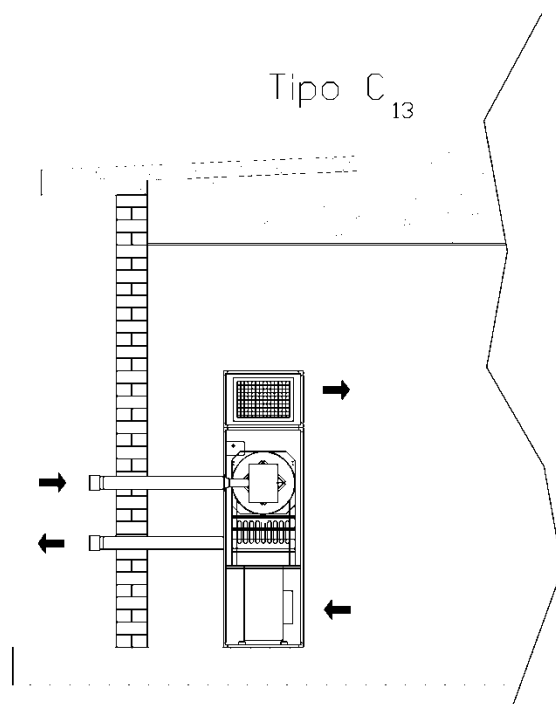
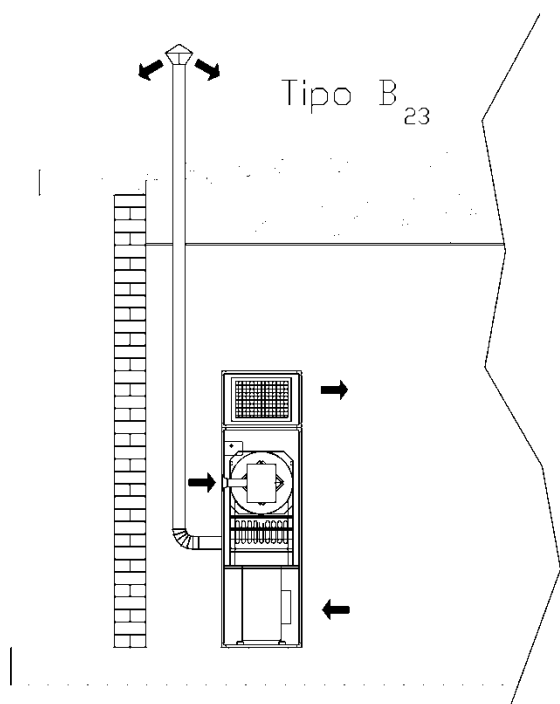
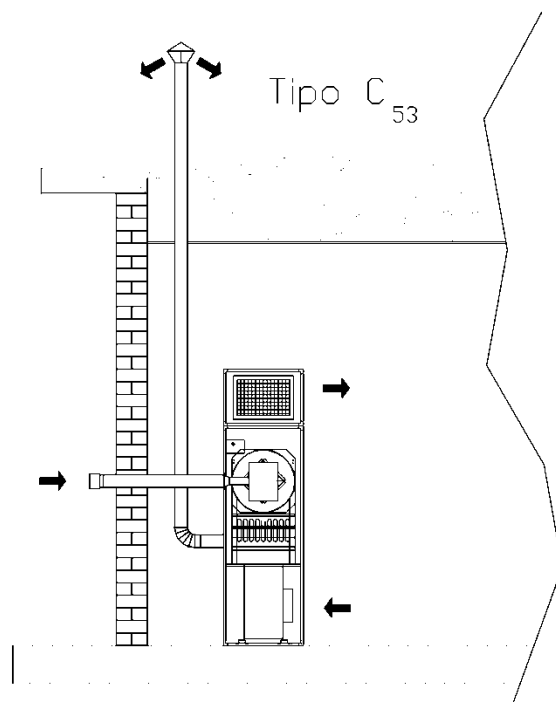
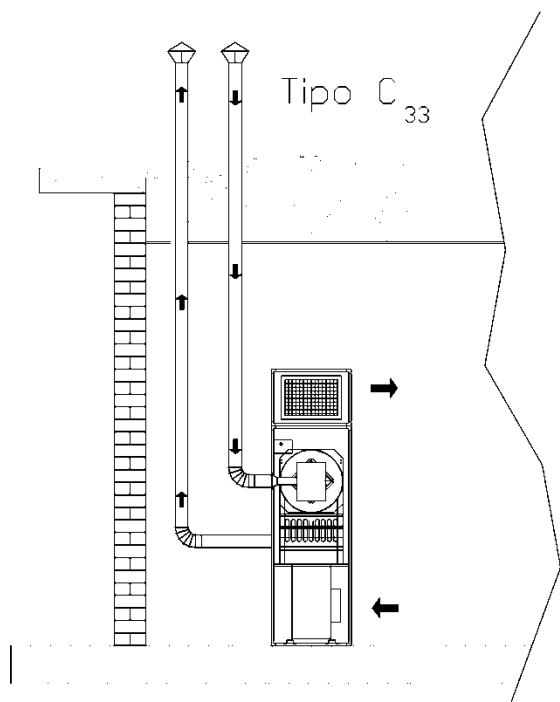
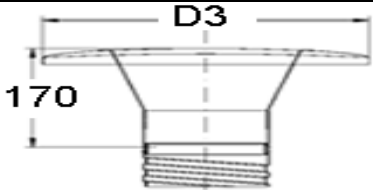
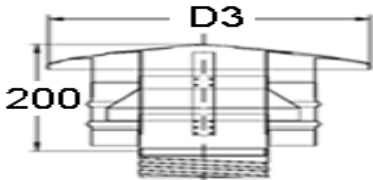
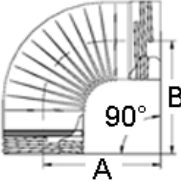
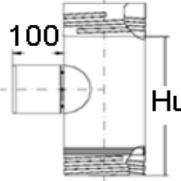
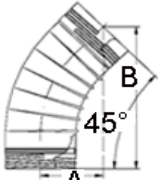
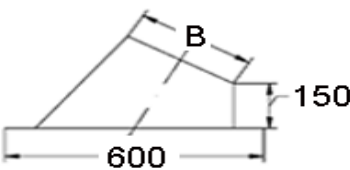
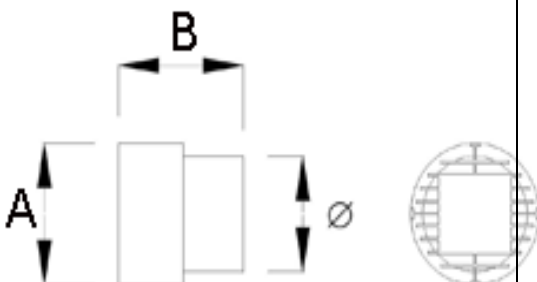


TABLE OF PRESSURE DROPS IN CMT PIPES AND ELEMENTS
(FOR FLUE AND COMBUSTION AIR INTAKE)

MODEL		50	65	80	100	150	175	200
Available pressure (Pa) for flue and combustion air intake		50	50	50	50	50	50	50
PIPE DESCRIPTION								
Rigid pipe Ø 100 mm -Length 1 m	Flue	2,7	4	6,5	9,8	-	-	-
	Combustion air intake	2	3	4,8	7,2	-	-	-
Rigid pipe Ø 130 mm -Length 1 m	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
Rigid pipe Ø 150 mm -Length 1 m	Flue	0,4	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	0,3	0,4	0,7	1,0	1,9	2,0	3,3
ELEMENT DESCRIPTION								
90° moulded bend R/D=1.5 - Ø 100 mm	Flue	5,4	8,0	13,0	19,6	-	-	-
	Combustion air intake	4,0	6,0	9,6	14,4	-	-	-
90° moulded bend R/D=1.5 - Ø 130 mm	Flue	1,5	2,2	3,6	5,4	10,8	12,4	18,2
	Combustion air intake	1,1	1,6	2,6	3,9	8,0	15,0	13,4
90° moulded bend R/D=1.5 - Ø 150 mm	Flue	-	1,2	2,0	3,0	5,8	6,0	9,8
	Combustion air intake	-	0,8	1,3	1,9	3,9	4,0	6,6
45° moulded bend R/D=1.5 - Ø 100 mm	Flue	2,7	4,0	6,5	9,8	-	-	-
	Combustion air intake	2,0	3,0	4,8	7,2	-	-	-
45° moulded bend R/D=1.5 - Ø 130 mm	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
45° moulded bend R/D=1.5 - Ø 150 mm	Flue	-	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	-	0,4	0,7	1,0	1,9	2,0	3,3
"Chinese hat" terminal Ø 100		3,8	5,6	9,1	13,7	-	-	-
"Chinese hat" terminal Ø 130		1,1	1,6	2,5	3,8	7,6	8,7	12,7
"Chinese hat" terminal Ø 150		0,6	0,9	1,4	2,1	4,1	4,2	6,9
Weatherproof terminal Ø 100		4,7	7,0	11,4	17,2	-	-	-
Weatherproof terminal Ø 130		1,3	2,0	3,2	4,7	9,5	10,9	15,9
Weatherproof terminal Ø 150		0,7	1,1	1,8	2,6	5,1	5,3	8,6
TE90° union - Ø 100		8,1	12,0	19,5	29,4	-	-	-
TE90° union - Ø 130		2,3	3,4	5,4	8,1	16,2	18,6	27,3
TE90° union - Ø 150		1,26	1,83	3	4,5	8,7	9	14,7
TR terminal - Ø 100 mm	Flue	2,7	4,0	6,5	9,8	-	-	-
	Combustion air intake	2,0	3,0	4,8	7,2	-	-	-
TR terminal - Ø 130 mm	Flue	0,8	1,1	1,8	2,7	5,4	6,2	9,1
	Combustion air intake	0,6	0,8	1,3	1,9	4,0	7,5	6,7
TR terminal - Ø 150 mm	Flue	-	0,6	1,0	1,5	2,9	3,0	4,9
	Combustion air intake	-	0,4	0,7	1,0	1,9	2,0	3,3

MODEL		250	300	
Available pressure (Pa) for flue and combustion air intake		50	50	
PIPE DESCRIPTION		Pressure drop in CMT pipe for length unit Pa/m		
Rigid pipe Ø 200 mm -Length 1 m	Flue	2,5	3,4	
	Combustion air intake	1,7	2,3	
Rigid pipe Ø 250 mm -Length 1 m	Flue	-	-	
	Combustion air intake	-	-	
Rigid pipe Ø 300 mm -Length 1 m	Flue	-	-	
	Combustion air intake	-	-	
ELEMENT DESCRIPTION		Pressure drop Pa/element		
90° moulded bend R/D=1.5 - Ø 200 mm	Flue	5,0	6,8	
	Combustion air intake	3,4	4,6	
90° moulded bend R/D=1.5 - Ø 250 mm	Flue	-	-	
	Combustion air intake	-	-	
90° moulded bend R/D=1.5 - Ø 300 mm	Flue	-	-	
	Combustion air intake	--	-	
45° moulded bend R/D=1.5 - Ø 200 mm	Flue	2,5	3,4	
	Combustion air intake	1,7	2,3	
45° moulded bend R/D=1.5 - Ø 250 mm	Flue			
	Combustion air intake			
45° moulded bend R/D=1.5 - Ø 300 mm	Flue			
	Combustion air intake			
"Chinese hat" terminal Ø 200		3,5	4,8	
"Chinese hat" terminal Ø 250		-	-	
"Chinese hat" terminal Ø 300		-	-	
Weatherproof terminal Ø 200		2,9	3,9	
Weatherproof terminal Ø 250		-	-	
Weatherproof terminal Ø 300		-	-	
TE90° union - Ø 200		3,8	5,1	
TE90° union - Ø 250		-	-	
TE90° union - Ø 300		-	-	
TR terminal - Ø 200 mm	Flue	2,5	3,4	
	Combustion air intake	1,9	2,5	
TR terminal - Ø 250 mm	Flue	-	-	
	Combustion air intake	-	-	
TR terminal - Ø 300 mm	Flue	-	-	
	Combustion air intake	-	-	

FLUE AND COMBUSTION AIR INTAKE ELEMENTS

	DESCRIPTION	ELEMENT DIMENSIONS				
		D1	100	130	150	200
	"T6" CHINESE HAT	D3	240	320	320	400
	"T20" WEATHERPROOF TERMINAL	D3	240	320	320	400
	90° MOULDED BEND	A B	185 205	210 225	240 240	185 135
	90° T UNION	HU	275	275	445	440
	45° MOULDED BEND	A B	92 213	90 235	95 245	140 310
	5/30° ADJUSTABLE FLASHING ("T7")	B	110	140	160	210
	WINDPROOF WALL TERMINAL ("TR")	A B	120 150	160 150	170 150	220 150

CONNECTING THE CONDENSATE DRAIN

The warm air heater is provided with a condensate drain pipe, flue side, which drains the condensate produced in the heat exchanger. The sloping tubes of the heat exchanger let the condensate flow towards the rear fume box and the condensate drain. A trap is also supplied, and the installer shall connect it to the heater's condensate drain pipe and to the condensate disposal system (see the drawing below). Unions must be watertight. The disposal system piping must be calculated based on the condensate litres/hour (see the table on Chapter DATA SHEET), and its internal diameter must not be less than 20 mm.

The condensate disposal pipes must be made of synthetic material (such as PVC or corrosion-proof stainless steel). Do not use galvanized steel pipes.

The trap provided is complete with a float valve, to prevent fume leaks, and must be filled with water before the first start-up.

The condensate disposal piping can be:

- provided with trap and closed disposal pipe. Use this system for warm air heaters installed in the heated ambient or inside a room.

Due to frost hazard, install an open piping (see the drawing below) for outdoor disposal systems.

Caution: the condensate disposal piping must be installed at a level lower than the trap.

- free: this system is recommended for outdoor warm air heaters, if permitted by local regulations. The condensate is drained directly outside.

Caution! To let the condensate out, make sure the warm air heater has been installed on a flat surface.

Caution! The pH of the condensate produce during methane combustion is approx. 3.5! This pH can be neutralised by a condensate neutralisation kit.

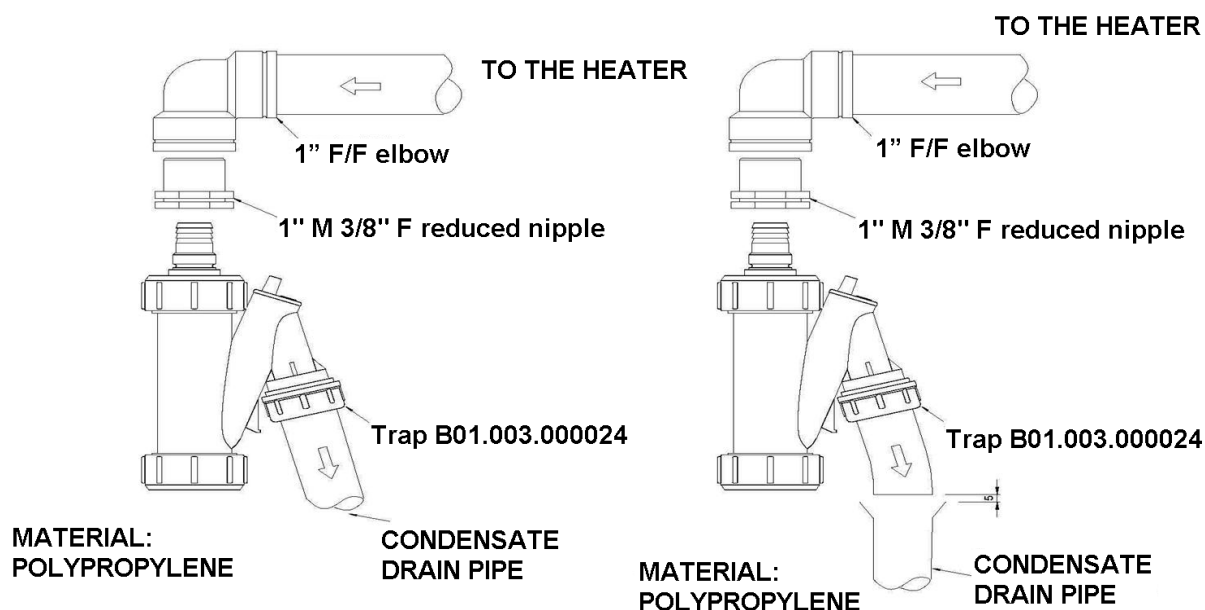


Fig 5 Trap with closed piping and trap with open piping

ASSEMBLY OF DIRECT AIR DELIVERY PLENUM

The plenum, if any, must be assembled as described on chapter **PLENUM** of this manual; it is recommended to apply silicone sealant on contact surfaces.

In the standard version, the plenum is provided with grilles on three sides and adjustable horizontal/vertical fins.

CAUTION! Make sure the air delivery fins are not too inclined, for their capacity and delivery would be reduced.

INSPECTIONS ON FIRST START-UP

- Check the performance of burner RX and make sure that the emissions of CO₂, CO and Nox do not exceed the pre-determined tolerances, as shown in the table on Chapter **DATA SHEET**. Consul the manual of the RX burner, delivered together with this warm air heater.
- Visually check that the burner flame is regular and does not hit the bottom of the combustion chamber.
- Check that the direction of rotation of the fan(s) is the one indicated by the arrow on the impeller (see fig. 7)
- Check motor absorption by means of ammeter and make sure it does not exceed the values specified on Chapter **DATA SHEET**.
- Check the performance of heater thermostats: FAN, LIMIT and LIMIT2 (see Chapter **TRI-THERMOSTAT**)
- Perform a combustion analysis
- Prepare a power station or plant handbook and record the information required to be disclosed pursuant to the laws, rules, regulations and standards in force.

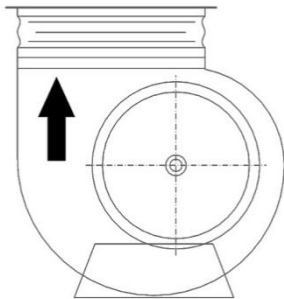


Fig 7 Direction of rotation of the fan(s)

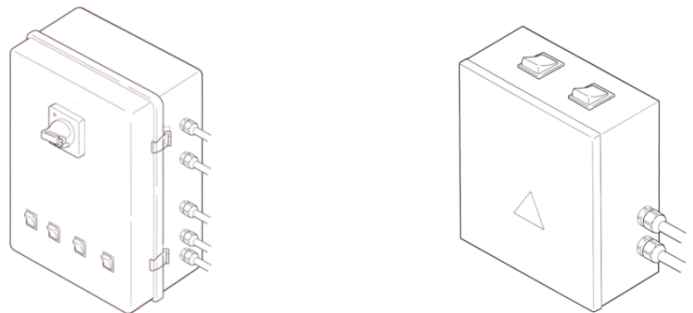


Fig 6 Electrical board for 1Ph and 3Ph.

TRI-THERMOSTAT

Three thermostats composed of a FAN, LIMIT2 and LIMIT

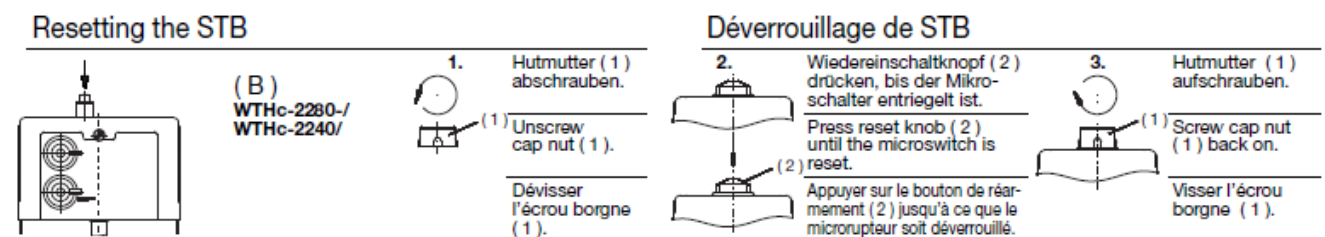
FAN (TR)- fan thermostat, normally open, to automatic start and stop the fan when the average air outlet temperature reaches a pre-set value. The set point is fixed by moving the setpoint marker (2) in an internal scale (3), placed inside the TR casing. This adjustment must be set to 30°C.

Setting this value over, a delay on fan starting may be caused, so increasing fuel consumption and impairing the long life of the heater. On the cooling phase, the thermostat stops the fan at about 14°C, lower his starting point.

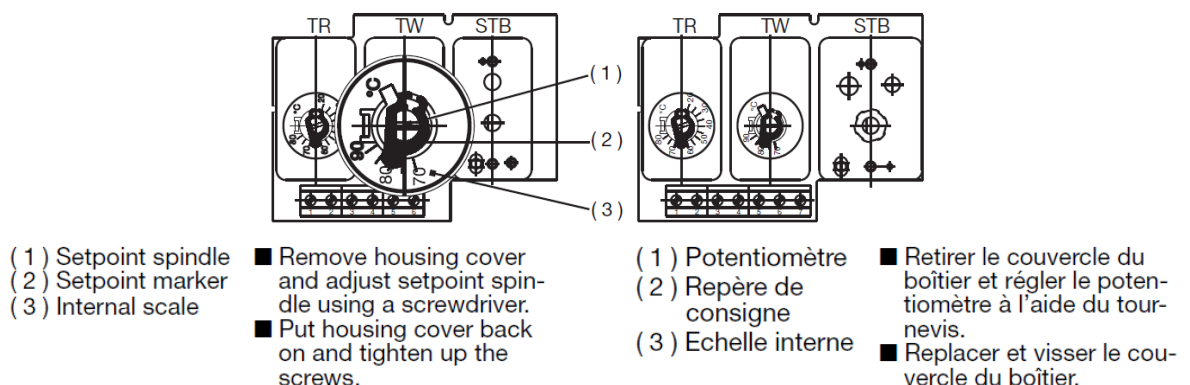
- **For all installations, EXCEPT** for installations such as **PRESSOSTATIC structure**, the fan is operated as described in paragraph FAN (TR).
- **For application in PRESSOSTATIC STRUCTURE** the FAN must operate continuously.
The electrical connections of the thermostat are performed in order to keep the fan always on (see scheme below).

- **LIMIT2 (STB)-** Security limit thermostat for the burner, normally closed with manual reset, to automatic stop the burner in case the average air outlet temperature overheat above the pre-set value. The set point at 100°C, is fixed by the manufacturer. **This set point must not be changed.** The LIMIT2, when intervening, stops the burner, while the fan keeps turning to cool the heat exchanger.

To reset the burner, first wait the air outlet temperature drops down; than push the reset green button .



- **LIMIT (TW)-** Temperature limit thermostat for the burner, normally closed, to automatic stop the burner when the average air outlet temperature exceeds the pre-set value. The set point, fixed by the manufacturer inside the casing, is at 70°C; and can be increased maximum at 80°C. The LIMIT reset is automatic, when air outlet temperature drops of about 14°C, below his set point.

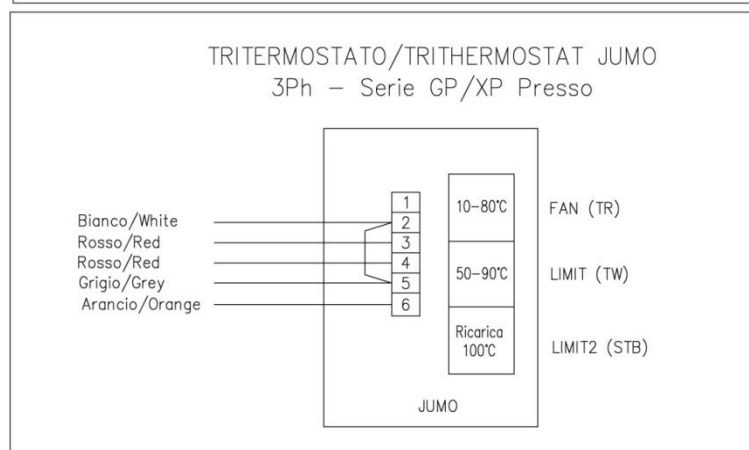
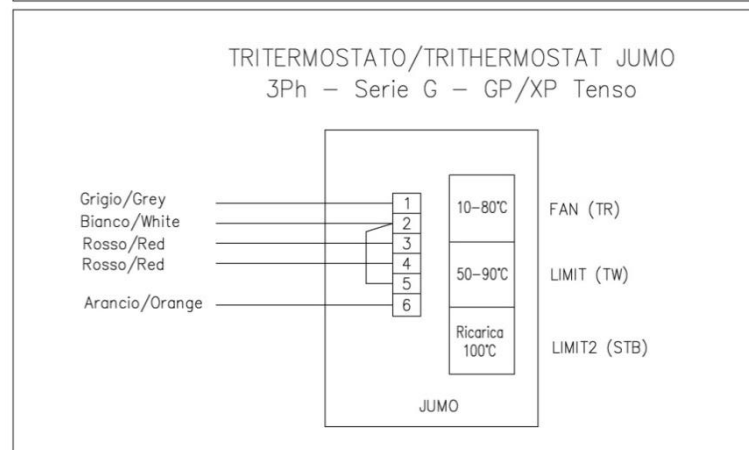
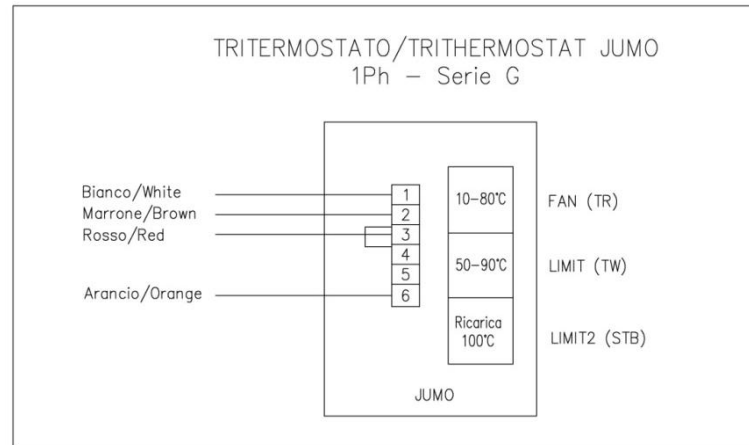


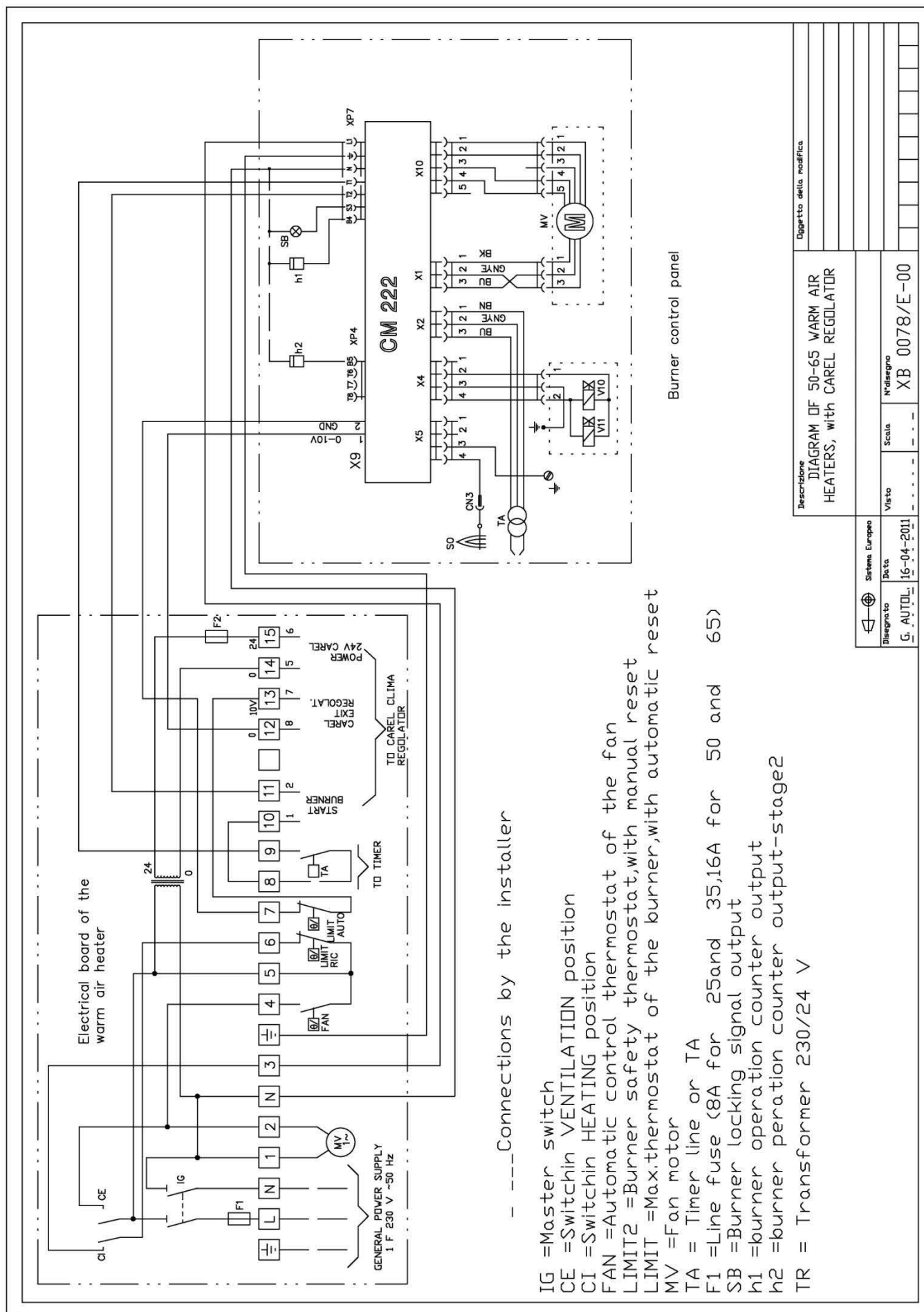
CAUTION! Make sure that the manual-reset LIMIT2 is not activated due to:

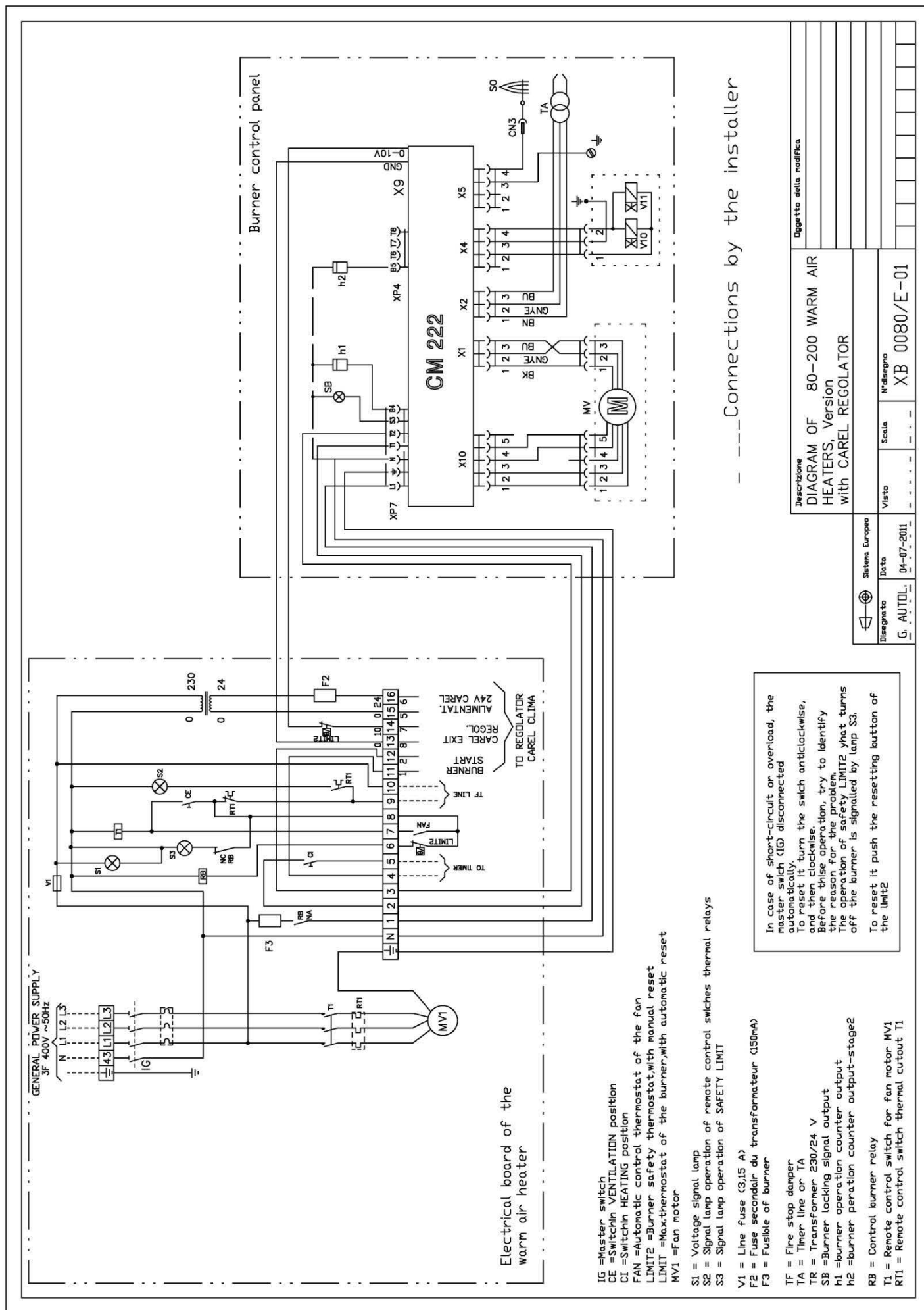
- **Low air flow rate, caused by obstructions and obstacles in the air exhaust/distribution system**
- **Clogged air filters (if installed)**
- **Heater stopped using the master switch or owing to a power failure during operation**

- **Operation of the fire damper**
- **Tri-thermostat bulbs too inclined downwards or too close to the heat exchanger, that speed up its operation.**

Once all these problems have been solved, if the fault persists contact the after-sales service or qualified personnel. CAUTION! Check, before the first start-up, that the tri-thermostat bulbs are inclined upwards and do not touch the heat exchanger.







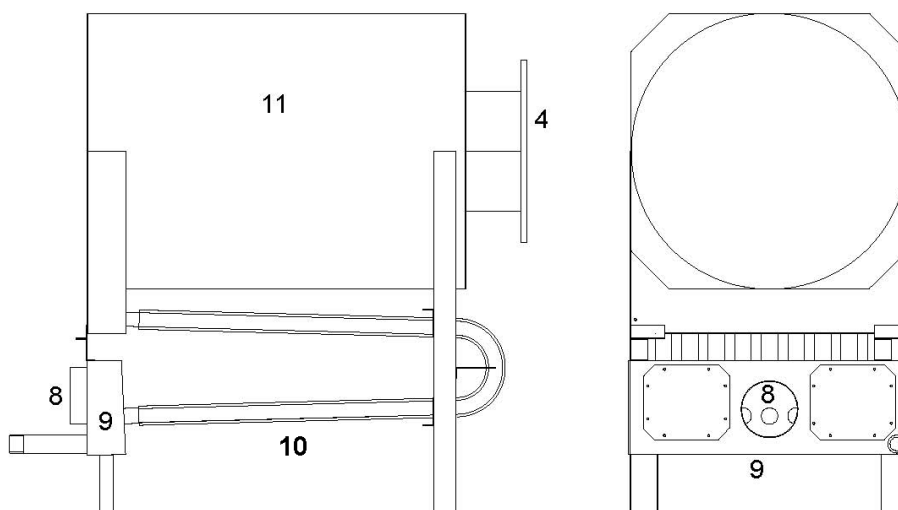
MAINTENANCE

The warm air heater and the burner must be serviced by an authorised service centre or by qualified personnel, in compliance with the requirements set forth by law. For proper and safe warm air heater operation, and for its long life, the operations listed below should be carried out at regular intervals:

CAUTION! Before doing maintenance or servicing the appliance, disconnect it from mains supply and close fuel supply.

CLEANING THE HEAT EXCHANGER

the heat exchanger must be cleaned from soot and deposits, to preserve heat exchange capacity. Clean it at the end of each heating season or more often. Start-up defects could be due to the presence of soot inside the heat exchanger, obstructing the exhaust gas line. The accumulation of excess soot could depend on a variety of reasons, such as faulty draught, poor quality fuel, lack of air in the burner. To clean the heat exchanger, proceed as follows.



FLUES (10)

Remove the rear panel, flue connection (8) and the 2 covers of rear fume box (9).

Clean the pipe interior, after removing the vortex tubes.

Collect the soot at the back. Before reinstalling the 2 covers of the fume box, check that its seals are intact; otherwise, replace them with similar seals (with the same code). Remove the pipe on flue connection (8) and clean rear fume box (9).

COMBUSTION CHAMBER (11)

Remove the burner from its plate (4).

Clean external walls for soot and deposits.

Check that the combustion chamber is not damaged.

Check that the seal of the burner supporting plate and the relevant seal on the nozzle are in good condition; if not, replace them with seals having the same code.

Note: All seals are asbestos-free and compliant with EC standards.

CLEANING THE FILTER ON AIR INLET

the filter is an accessory. A dirty filter reduces the air flow, increases discharge temperature, reduces heat exchange and heater efficiency. It is very important to clean the filter at regular intervals, so that it remains always clean. The cleaning interval depends on the amount of dust in filtered air.

To clean it, proceed as follows:

- Remove the filter from its seat
- Shake it and leave the dust fall
- Blow the filter with counter-current compressed air
- From time to time, for a more thorough cleaning, wash the filter in warm water with some detergent; dry and place it in its seat again

CAUTION! The filter is an accessory to be ordered separately.

CAUTION! When the filter has been washed for the third time, replace it with a new filter, with the same code.

VENTILATING UNIT

Check, at least once at the beginning of each season:

- The proper alignment of pulleys and drive belts, if any, and check them for wear (if necessary, replace them with belts of the same size)
- The direction of rotation of the ventilating unit, indicated by the arrow on the fan (see fig 7)
- The belt tensioning. Grasp them: they must not become loose by more than 2-3 cm (see fig 8). To adjust tensioning, screw or unscrew the belt tightening bolt on the motor slide (18).
- The motor absorption, in Ampere, must not exceed the value specified on Chapter DATA SHEET.
- Check the tri-thermostat performance (see Chapter TRI-THERMOSTAT).

BURNER

For burner maintenance, comply with the instructions provided in the RX burner manual, delivered together with the heater.

Check:

1. The gas pipe tightness
2. The tightness and condition of the stack and connecting ducts or of the flue system/combustion air intake.

COMBUSTION ANALYSIS

At least once, at the beginning of each heating season, unless the current standards require shorter intervals, have a combustion analysis carried out and recorded in the POWER PLANT or PLANT HANDBOOK.

NOTE: Take note of all replaced components.

TABLE OF MINIMUM MAINTENANCE INTERVALS

MINIMUM INTERVAL	TYPE OF PERIODICAL MAINTENANCE
Every day	Clean air filters, if installed, if they are clogged.
Once every 80 hours	Clean and inspect the heat exchanger.
At least once at the beginning of each heating season	
At least once at the beginning of each heating season	Clean and inspect the combustion chamber
	Clean and inspect the ventilating unit.
	Check the performance of electrical and safety components
	Combustion analysis

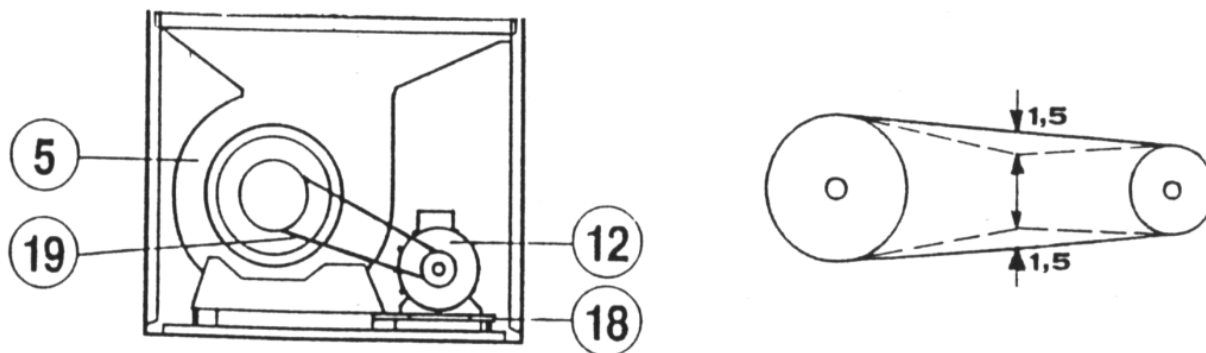


Fig 8 Warm air heater components

TROUBLESHOOTING

Use the table below to identify any possible problems. If a problem cannot be solved as suggested in the table, contact the authorised after-sales service or qualified personnel.

FAILURE	CAUSE:	REMEDY:
1. The master switch is on -I- and the change-over switch in the VENTILATION position: the signal lamp is off and the ventilating unit stopped.	1. The electrical board is not energised.	1. Check that the master switch upstream of the electrical board is on.
	2. The line fuse is burnt.	2. Replace the fuse with another piece, with the same characteristics.
2. Like n° 1), but the REMOTE CONTROL SWITCH THERM. lamp is on.	1. E' intervenuta la termica del teleruttore e ha tolto tensione al motore. only for 3-phase voltage heaters	1. To reset, turn off the master switch (IG), open the electrical board cover and press the push-button of the remote control switch's thermal relays.
3. With the master switch on -I-, the voltage lamp on, the change-over switch in the HEATING position and the room thermostat on: the burner does not start.	1. Poor connection of the room thermostat/timer.	1. Contact the after-sales service, to have the component repaired or replaced.
	2. Defective burner.	2. Contact the after-sales service, to check the burner.
	3. The max. LIMIT thermostat is on.	3. Wait until the air temperature drops below 65°C.
4. Like § 3), with the SAFETY LIMIT OPERATION switch on.	1. The max. LIMIT2 thermostat is on, because the air leaving the appliance is overheated.	1. Reset the burner, as described on Chapter TRI-THERMOSTAT
5. Come al punto 3), ma il bruciatore dopo la fase di prelavaggio va in blocco e non si forma la fiamma.	1. Defective burner, or no more fuel.	4. Contact the authorised after-sales service of the burner.
6. The burner is on, but the ventilating unit is not yet running and, then, starts/stops continuously.	1. Excess FAN calibration. .	1. Calibrate it (see Chapter TRE-THERMOSTAT)
	2. Defective FAN.	2. Contact the after-sales service to have it replaced.
	3. The temperature of the incoming air is below 0°C.	3. Try to increase this temperature.
	4. Insufficient gas flow rate.	4. Contact the authorised after-sales service of the burner.
7. The burner is on, but the fan does not start and the REMOTE CONTROL SWITCH THERM. lamp is on only for 3-phase voltage heaters	1. The remote control switch's thermal relays are on, due to the motor.	1. Reset the thermal relays, according to § 2).
	2. Faulty electric motor(s), defective contact or seized bearings.	2. Contact the after-sales service, to check the ventilating unit.
8. During operation, the burner stops before the room thermostat or timer operation.	1. LIMIT Operation	
	2. Safety LIMIT2 operation.	2. 2. Reset the burner See Chapter .TRI-THERMOSTAT).
NOTE: IN CASE OF BURNER FAILURE, CONSULT THE MANUAL OF THE "RX" BURNER, DELIVERED TOGETHER WITH THE WARM AIR HEATER.		

ANNEXES

MANUAL "Clima" CAREL for the modulation of burner

Clock digital proportional temperature regulator. Timer and real-time clock for day and night operation.

Delivered with the warm air heater series AS COND - AS COND EX, with modulating burner RX

General features

"CLIMA" Carel mod. ADCA000110, is an electronic instrument, installed in the heated room, as the remote user terminal, with following operating functions:

- 1) Regulates the modulation of the RX burner. The modulation starts when "CLIMA" detects a room temperature of Set-Point T minus 2°C (configured by the manufacturer with parameter dFA). "CLIMA" operates a proportional regulation (modulation) of the RX burner, with 0-10V analogue output. Example:
"CLIMA" room temperature Set-Point 20°C; "CLIMA" starts modulate the burner when detect 18°C and modulates between 18-20°C.
The modulation can be operated even by a NTC sensor on air outlet temperature (example SET POINT 44°C of air outlet temperature. The modulation starts at 42°C of air outlet temperature); or by NTC sensor on air recirculation temperature (example SET POINT 20°C of air recirculation temperature; modulation starts at 18°C). In this case there is a need of a room thermostat to switch ON-OFF the burner. This solution is applied also with roof top operated by PCB controller.
- 2) Operates as room thermostat: switch-off the burner when detects room temperature of Set-Point T (11) set on the "CLIMA". The burner start-on again when room temperature is -0,5°C (configured by the manufacturer with parameter dIF) of Set-Point T (11). The burner start-on at a modulate thermal power, set by the manufacturer with parameter dSA. Example: "CLIMA" room temperature Set-Point 20°C; "CLIMA" switch-off the burner when detects 20°C; when detects 19,5°C in the room "CLIMA" starts-on again the burner. **This function is not operating with roof top, because operated by PCB controller.**
- 3) Setting the clock, the time bands, and the default value of the timer for the burner RX and so for the warm air heater, in "heating". For this setting press **PRG** and, by pressing in sequence **SET**, **▲▼**, **SET** set the following parameters: **rtc** : real time; **dAy**: starting time of day mode; **nlt**: starting time of night mode; **SLP** eventually: time interval between **dAy** day running mode, and **nlt** night running mode. With the clock incorporate is possible set the time bands modes, 2 bands per day, the same for all the 7 days of the week. In case of electric feeding's lack, **rtc** real time remains in memory for 2 days maximum.
The supervisor remote control option (purchasing the accessory code IROPZ48500) allows the data from the instrument to be monitored and saved.

The function, of Set-Point compensation based on the outdoor temperature probe reading NTC is available. For this "CLIMA" must be connect to the NTC outdoor temperature probe reading (option on demand).

Installation

"CLIMA" regulator is delivered, together with the warm air heater and burner, with parameters **dFA**, **dSA**, **dIF** already configured by the manufacturer (see par. 1 and 2). The installer must set the **rtc** real time parameter; and **dAy**: starting time of day mode; **nlt**: starting time of night mode; **SLP** eventually: time interval between **dAy** day running mode, and **nlt** night running mode.

Disconnect the power supply to the controller and the loads before working on the instrument.

For correct installation, proceed as follows:

- separate the front panel from the rear part by levering the tab, as shown in Figure 2.
- Fasten the instrument to the wall horizontally, so as to allow the circulation of air. For accurate measurements, position the instrument away from sources of heat or humidity, away from windows or outside walls.
- Pass the connection cables through the centre hole in the bottom shell and connect them to the terminal block provided, observing the markings shown on the label. Separate the connection and control cables from the relay cables.

Place a clamp around the two groups of cables (signal and power supply, relay outputs) near the terminals.

- Check inside the "CLIMA" the dipswitches must be in the following position (see the table below).

Name	Switch 1	Switch 2	Switch 3	Switch 4	Model	Product code
T	Off	On	Off	On Heating mode	Basic temperature control with one relay only. Analogue output associated with temperature.	ADCA000110

- Reconnect, if previously disconnected, the flat connection cable between the rear and the front panel, ensuring the polarity is correct.

- Close the instrument with the opposite movement, making sure the flat connection cable does not hinder the operation.
- To ensure electrical safety (EN60730-1), insert the plastic tab and tighten the screw to stop the instrument from opening (see Fig. 2).

SERIAL CONNECTION OPTION

To connect the instrument to the supervisor serial line, the accessory code IROPZ48500 is required. For correct operation, turn the instrument off and connect the option to J1, as shown in Fig. 6. For details on the RS485 serial line, see the instruction sheet enclosed with the accessory.

PARAMETER PROGRAMMING OPTION

The optional programming key code PSOPZKEY00 or PSOPZKEYA0 can be used to program the parameters on the instrument. To connect the key, turn the instrument off and connect the key to J1, as shown in Fig. 6. For further information on the operation of the key, see the corresponding instruction sheet.



















GENERAL WARNINGS

Avoid installing the boards in environments with the following characteristics:

- Strong vibrations or knocks.
- Exposure to jets of water.
- Strong magnetic and/or radio frequency interference (for example, near transmitting antennae).
- Exposure to direct sunlight and to the elements in general.
- To clean the display use a soft cloth. Do not use water or solvents.
- Operation at particularly low temperatures may cause an evident decrease in the response speed of the display. This should be considered normal and does not indicate a malfunction.
- A power supply voltage other than that specified may seriously damage the instrument.
- Separate as much as possible the control cables from the cables to the inductive loads and power cables to avoid possible electromagnetic disturbance. Never insert power cables (including the electrical cables) and probe and serial communication cables 0-10V in the same conduits.
- Do not install the communication cables in the immediate vicinity of power devices (contactors, circuit breakers or similar). The cables that come out of the controller must not be in view, but rather run inside the conduit.
- If the appliance is used in a manner not specified by the manufacturer, the rated protection of the appliance may be compromised

FUNDAMENTAL OPERATIONS OF THE INSTRUMENT

Below is the meaning of the buttons in normal operating conditions:

BUTTON	MEANING
Power	Switch the "CLIMA" instrument On/Off. The button may be disabled, if the On/Off function is associated with the digital input. When the instrument is switched off, all controls are disabled, except for the antifreeze function.
C/F	Selects the temperature display mode, between degrees Celsius and Fahrenheit. When pressed switches between the two temperature units.
SET	Used to display and when necessary set, using the buttons   , the set point displayed in the SMALL field. If pressed for more than 5 seconds, accesses the parameters menu. To scroll the various parameters, use   . When on a parameter, to modify press SET, than modify with   and confirm by pressing the SET button again; and to exit the parameters menu, press the PRG button.
	Activates the opposite operating mode to the current mode (sleep when in day mode or day when in sleep mode), for the time displayed. To change or reset the timer, use   to increase or decrease the time. Press again to exit and return to the main menu. If the mode is already active pressing the button will show the time remaining until the timer expires.
	Accesses the menu for setting the clock, the time bands, and the default value of the timer . When first pressing the button, the current time is displayed (rtc); to display the other parameters, use the   . To set a new parameter's value press SET when the required parameter is displayed and change the value using with   . Press again PRG to exit and return to the main menu.
	Accesses the menu for displaying the current outside temperature, and the maximum and minimum since the instrument was last switched on. To display the various temperatures press   . For the meanings see the box with the house symbol. Press the PRG button to return to the main menu.
	From the main menu increases the value of set point displayed in the large field. From the other menus displays the variables or the parameters or alternatively changes the value if first pressing SET.

▼	From the main menu decreases the value of set point displayed in the large field. From the other menus displays the variables or the parameters or alternatively changes the value if first pressing SET.
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Important: the operating mode can be changed with the instrument on or off. When the mode is changed, the user is asked whether to use the default parameters for that mode. If yes, press SET, taste UP and SET again. Otherwise press PRG to exit.

TABLE OF ERRORS

Code displayed Description

ALE	External alarm generated by the digital input. If set from parameter
EE	Parameter memory alarm. Stops control of the instrument until the default parameters are loaded
E1	Inside temperature probe alarm
E2	Outside temperature probe alarm
Eth	Digital temperature or humidity sensor alarm (only in the models where featured)
Ert	Real time clock alarm (only in the models where featured)
ELN	No link: control of the outputs by supervisor has been set, but there is no connection (parameter Lin = on)

TECHNICAL SPECIFICATIONS

- Power supply: 24 Vac +10% -15% 50/60Hz 1 VA, 22-35 Vdc 0.5W
- Operating conditions: 0T60°C, 10-90%RH non-condensing
- Storage conditions: -20T70°C, 10-90%RH non-condensing
- Dimensions (mm): 135x86x36mm;
- Environmental pollution: normal;
- Degree of pollution: degree II;
- Software class and structure: A;
- Actions type: 1C
- Index of protection: IP20;
- Ball pressure test temperature on the plastic of the frontal case: 100 °C;
- Ball pressure test temperature on the plastic of the back case: 125 °C;
- Classification according to protection against electric shock: II, to be integrated into class I or II appliances;
- Period of electrical stress across the insulating parts: long;
- Control device designed to be supplied to: manufacturers, installers and maintenance personnel;
- Immunity against voltage surges: category 1;
- Cross-section of the wires (mm²): from 0.5 to 1.5 mm²;
- Precision of the inside temperature measurement: +/- 1°C
- Precision of the outside temperature measurement: NTC (standard 10k) range -40 + 60 °C precision +/- 0.5 °C + sensor precision, +/- 1°C from 0 to 40 °C, +/- 1.5 °C above
- 0-10V analogue output, non-insulated, for proportional control: precision +/-5% max load 2 KOhm, max current 5 mA
- Approval of the relay outputs: EN60730-1: NO 1(1)A 250Vac, class II reinforced insulation from the instrument. Basic insulation between the relays.
- UL-873: NO 1A resistive 24Vac, 30Vdc, 100,000 cycles/ PILOT DUTY: 24Vac, I make 15A, break 1A, 30.000 cycles.
- Precision of humidity measurement (in the models where featured): +/- 3%rh at 25C, +/- 5% rH from 0 to 60 °C, range 10-90 % Rh

CONNECTIONS

The installer must connect the "CLIMA" regulator (see fig. 4) to the electric control board of roof top, with n. 6 cables , and keeping separate the tension cables from the analogue output 0-10V ones for the RX burner proportional regulation . The "CLIMA" regulator must be installed not more than 30 m. from the warm air heater X or roof top, as cable length.

- digital input:
 - non-insulated version: direct connection of the voltage-free contact; contact closing current: 3-5 mA .
 - insulated version with external power supply and 24 Vac contact: class II safety external power supply separated from the 24 Vac of the instrument (Fig. 4b)
- Outside probe connection with standard Carel probes (10K 25°C B=3435):
 - maximum length: 30 m with min cable cross-section 0.5 mm².
- Digital input connection: maximum length 10 m, min. cable cross-section 0.5 mm².
- Analogue output connection: maximum length 10 m, min. cable cross-section 0.5 mm².
- Relay output connections: cable length max 30 m. And cross-section from 1.5 to 2.5 mm². Reinforced insulation class II
- Relay output:: to use the instrument in compliance with UL-873, a load with a maximum voltage of 24 Vac, class II, can be connected.
- UL instructions for the connections:
 - Use 75° copper (CU) conductor and wire size No. 22-14 AWG, stranded or solid

- Use Terminal tightening torque of 4 Lb-In when green (PTR) terminal block is used or 7 Lb-In when black (SAURO) terminal series is used.

WARNING: All connections, except for the relays, must be connected to low voltage circuits with reinforced insulation.

IMPORTANT WARNINGS

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com.

The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the phase of configuration the product in order to reach the expected results in relation to the specific final installation and/or equipment.

The lack of such phase of study, which is requested/indicated in the user manual, can cause the final product to malfunction of which CAREL can not be held responsible.

The final client must use the product only in the manner described in the documentation related to the product itself. The liability of CAREL in relation to its own product is regulated by CAREL’s general contract conditions edited on the website www.carel.com and/or by specific agreements with clients.



Fig. 1

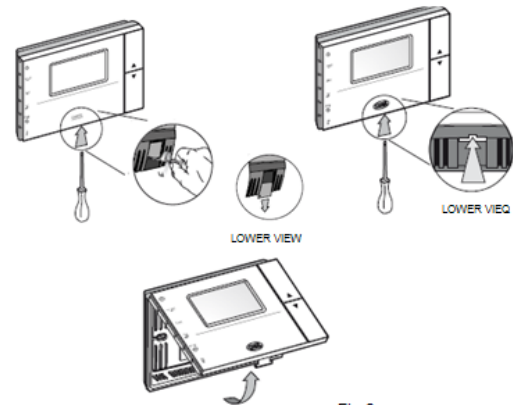


Fig.2

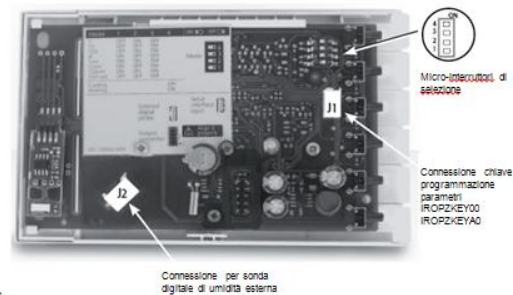
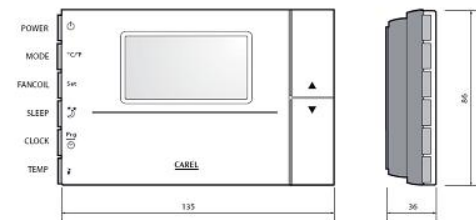
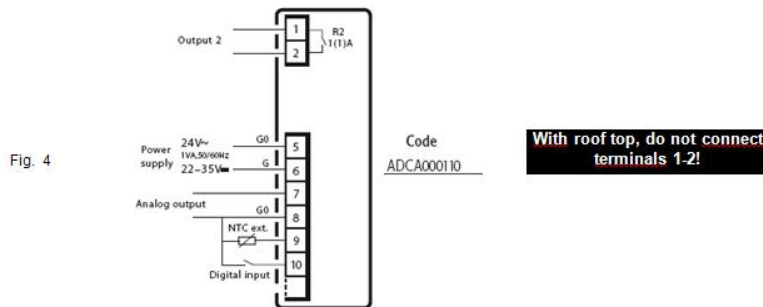


Fig. 3

Rif.	Description
1	Set point setting mode for the value on the large display
2	LARGE field. Displays ambient temperature checked by the "CLIMA"
3	Select Sleep operating mode
4	Lock mode. The parameter has already been set
5	Time bands active or display Clock
6	Select temperature: inside/outside - maximum/minimum
7	AUTO operating mode
8	Set point setting mode for the value on the small display
9	Cooling/heating mode. Ramp symbol on: the temperature control relay is active
10	Dehumidify/humidify mode. Ramp symbol on: the humidity control relay is active
11	SMALL field. Displays temperature of Set Point.

(A) - Version with direct connection for the digital input

Relay 1	Model ADCA000110
Ambient Temperature	T



MOST IMPORTANT PARAMETERS TO BE SET BY THE INSTALLER

We remember that:

- parameters **dFA e dSA** are factory set and must not be changed by the installer/customer, iif not agree with the manufacturer of the warm air heater
- parameter **rtC** real time must be set by the installer
- parameters **SLP, dAy, nlt** and relevant **ambient temperature Set Point T**, winter, summer, day, night : can be modified by the installer, from the default value factory set, see table of parameters.

In order to set/ verify the parameters procede as follows:

. SETPOINT for ambient temperature T: depending on different function modes **dAy, nlt**, several temperature Set Point T are factory set, you can see on display SMALL (11, fig. 3). To reset/change press SET for more than 5 seconds, for enter the parameter's menu.

To scroll the various parameters, use **▲▼** . When on a parameter, to modifie press **SET**, than modifie with **▲▼** and confirm by pressing the **SET** button again. For the current parameter on display is possibile change it directly with **▲▼** . To exit the parameters menu, press the **PRG** button.

Ambient temperature factory Set Point are:

- Set winter day (default 20.0°C) and night (default 18°C, minimum setting temperature 10°C)

CLOCK, TIME BANDS Press button **PRG**: parameter **rtC** is show; to scroll the various parameters, use **▲▼** . When on a parameter, to modifie press **SET**, than modifie with **▲▼** and confirm by pressing the **SET** button again. To exit the parameters menu, press the **PRG** button.

Parameters to verifie/reset are:

code	parameter	Factory set
rtC	clock hh.min	
dAy	start day band	Default 08:00
nlt	start night band	Default 20:00
SLP	manual changeover duration between dAy and nlt	Default 8 hours

To disable the time bands function, set parameter **rtC** OFF, as follows: press the **PRG** button, select parameter **rtC**, and change his value into 00:00, than press once more with **▲▼** to select OFF and press SET to confirm.

By parameter **rtC** OFF the function mode is allways day, and only day Set Points are operating; the night Set Points will be operating only by pressing button , change of status manual.

SLP manual changeover duration between **dAy** day band and **nlt** night band. To change this duration, press **PRG** and scroll **▲▼** to display **SLP**. Press **SET** and with **▲▼** modifie **SLP** value; or eliminate it, down to OFF. Press **SET** to confirm. To exit the parameters menu, press the **PRG** button.














After time bands are set, simbol CLOCK will appear on display.









The "**CLIMA**" regulator is ready. To start operate press **ON**.






For more information on the regulator "**CLIMA**", consult the general Clima CAREL manual on web site: www.carel.com and go on the type **ADCA000110**

6.1 Description of the parameters for the standard version

The parameters available depend on the clima model used and the level set (LE = 1 or 2)

code	parameter	range	default	UOM	note
	day temperature set point in cooling	10 to 50	24.0	°C	
	night temperature set point in cooling	10 to 50	26.0	°C	
	day temperature set point in heating	10 to 50	20.0	°C	
	night temperature set point in heating	10 to 50	18.0	°C	
	single day temperature set point for automatic modes	10 to 50	20.0	°C	
	single night temperature set point for automatic modes	10 to 50	18.0	°C	
dIF	Temperature differential for relay 1 This is an absolute value and is added to or subtracted from the set point depending on the control mode, cooling or heating.	0.1 to 10	1.0	°C	
dIF2	Temperature differential for relay 2. This is an absolute value and is added to or subtracted from the set point depending on the control mode, cooling or heating.	0.1 to 10	1.0	°C	
dS1	Temperature offset for relay 1 This value is added to or subtracted from the set point based on the active control mode. May be positive or negative, so as to offer complete flexibility in the position of the step.	-10 to 10	0.5	°C	
dFA	Analogue output differential This value is added to or subtracted from the set point according to the control mode selected, cooling or heating.	0 to 10	1.0	°C	
dSA	Analogue output offset from to the set point This value is added to or subtracted from to the set point according to the operating mode, cooling or heating.	-10 to 10	0.0	°C/ % rH	
EHI	Maximum water temperature for ON/OFF radiant floor heating control (mode 8, all dipswitches off). The screen shows alarm EHI and the relay output is deactivated, irrespective of the control mode.	10 to 80	40	°C	
ELo	Minimum water temperature for ON/OFF radiant floor cooling control (mode 8, all dipswitches off). The screen shows alarm ELo and the relay output is deactivated, irrespective of the control mode.	0 to 50	10	°C	
	Humidification set point	10 to 70	50.0	% rH	
	Dehumidification set point	10 to 70	70.0	% rH	
dFH 	Humidity differential for the activation of the analogue output and the relay.	1 to 20	5.0	% rH	
dFd 	Dehumidification differential for the activation of the relay.	1 to 20	5.0	% rH	
SFH  	Parameter to define the humidification/dehumidification status in day and night mode Activates or deactivates humidification or dehumidification control (based on DIP 4) with the time bands. The parameter can have the following three values 0 - Time bands disabled. The humidification/dehumidification control is always active, if featured, and is configured in relation to dip4 1 - Time bands enabled: When switching to the daytime band, humidification/dehumidification control (depends on dip4) is activated. When switching to the night band, humidification/dehumidification control (depends on dip4) is deactivated. 2 - Time bands enabled: When switching to the daytime band, humidification/dehumidification control (depends on dip4) is deactivated. When switching to the night band, humidification/dehumidification control (depends on dip4) is activated.	0 to 2	0	-	
AUT 	Humidity set point automatically compensated by the outside temperature If humidity control is featured, the ambient humidity is controlled with an automatic set point, defined from 1H to 7H using the buttons, as specified in the corresponding table (see page 15). If set to OFF the mode is disabled. Setting one of the levels in the table, the controller independently sets a humidity set point in relation to the outside temperature.	OFF 1H to 7H	OFF	-	

code	parameter	range	default	UOM	note
CSt	Parameter for set point compensation Parameter CSt enables and sets the gain for set point compensation according to the outside temperature. If CSt = 0 compensation is disabled. Also see parameters Ctt and Cts.	-1 to 1	0.0	°C	
CdF	Max differential for the compensated set point The maximum value for the compensated set point is limited by this parameter. In heating mode, if the difference calculated for set point compensation is higher than CdF, the instrument uses CdF as the maximum difference from the set point. Similarly, in cooling mode if the difference calculated for set point compensation is less than CdF, the instrument uses CdF as the maximum difference from the set point.	0 to 20	2.0	°C	
Ctt	Threshold for set point compensation in heating mode Temperature set point compensation in heating based on the outside temperature measurement: compensated set point = setpoint - (set point - Text - Ctt) * CSt Compensation is activated only if: Text < set point - Ctt	0 to 25	10.0	°C	
Cts	Threshold for set point compensation in cooling mode. Temperature set point compensation in cooling based on the outside temperature measurement: compensated set point = setpoint + (Text - set point - Cts) * CSt Compensation is activated only if: Text > set point + Cts	0 to 25	10.0	°C	
AdC	Configuration T2A e T2A+H Additional modes for the automatic operation: For temperature control only (T2A): Configuration 1: temperature control with set point and dead band only (2xds1). Configuration 2: temperature control only with automatic changeover of the set point. Configuration 3: temperature control only with cooling and heating set point, automatic changeover and manual ON/OFF control for outlet fan. For temperature + humidity control (T2A+H): Configuration 1: temperature control with set point and dead band only (2xds1). Two set points for humidity. Configuration 2: temperature and humidity control with cooling and heating set point and automatic changeover.	1 to 3	1	-	
		1 to 2		-	
dys	Active display configuration Used to set the values shown in the large and small fields on the display	1 to 4	1	-	
rtC	 Current time The large field displays the hours and the small field the minutes	00:00 23:59	00:00	h	
SLP	 Duration of manual day-night mode changeover The large field displays the hours and the small field the minutes (15 minute steps)	0 to 12	8 h	h	
dAy	 Day band threshold The large field displays the hours and the small field the minutes (15 minute steps)	00:00 23:59	8.00	h	
nIt	 Night band threshold The large field displays the hours and the small field the minutes (15 minute steps)	00:00 23:59	20.00	h	
di	Digital input configuration OFF: disabled 1 select remote cooling /heating 2 remote ON/OFF 3 select day/night(set alternativo) 4 remote alarm	OFF to 4	OFF	-	
POL	Digital contact polarity Used to choose whether to consider the digital input active when closed or open or alternatively whether or not there is voltage in the optically-isolated version. Voltage-free contact: nE: active when the input is closed PO: active when the input is open Optically isolated: nE: active when voltage is present at the input PO: active when voltage is not present at the input	nE, PO	nE	-	
EI	  Control cooling/heating operating mode Enables the possibility to define the operating mode, cooling/heating, by parameter rather than by DIP 4. dis: Parameter EI is disabled, cooling/heating mode is selected by DIP 4 on the rear. En: Parameter EI is enabled, cooling/heating mode is selected by parameter EI.	dis, En	dis	-	
EI	  Selects the mode, cooling or heating. E: The instrument works in cooling mode I: The instrument works in heating mode	E, I	E	-	

code	parameter	range	default	UOM	note
Lin	Instrument output control mode Enabling this parameter allows the outputs to be controlled directly via the serial connection. Warning, if enabled no control is performed independently by the Instrument. If active and the supervisor does not query the instrument for more than two minutes, the outputs are automatically disabled and the no link error (ELn) is signalled on the display. no: the function is disabled, yES: the function is enabled.	no, yES	no	-	
CAL+ Int 	Inside temperature calibration, digital sensor or NTC Within a maximum of ± 10 °C	-10 to 10	0.0	°C	
CAL+ EST 	Outside temperature calibration, NTC sensor Within a maximum of ± 10 °C	-10 to 10	0.0	°C	
CAL+HUn 	Digital humidity sensor calibration. Within a maximum of $\pm 15\%$ rH	-15 to 15	0.0	% rH	
LE	Parameter access level Level of access the control parameters for the active mode: Level 1: basic access, only the essential parameters for correct operation. Level 2: advanced access, used to set all the parameters for the selected control mode.	1, 2	1	-	
LOC 	Lock The lock parameter used to disable some functions of the instrument, as per the following settings: LOC = OFF LOC = 1: The UP/DOWN and time bands buttons are disabled LOC = 2: Only the time bands button is disabled In these cases, the LOCK symbol is shown on the display whenever attempting to perform an unauthorised operation.	OFF to 2	OFF		
Unt 	Temperature display mode Sets the temperature display mode, in degrees Fahrenheit or Centigrade. Unlike direct selection using the button, if changing the temperature display mode using parameter Unt, this becomes the default display mode when switching the instrument on.	°C, °F	°C	-	
nEd	Parameter for control with average value sensor values Defines the average control temperature (Tm), based on the weighted average of the Inside temperature (TI) and outside temperature (TE). Both the measurements must be valid and Tm is achieved with the following formula: $Tm = (TI * (100 - nEd) + TE * nEd) / 100$ The average temperature calculated is used for control and display.	0 to 100	0.0	%	
Add	RS485 serial address (the external option code IROPZ48500 is required). It can be read by the supervisor and can only be changed with direct access on the Instrument.	1 to 207	1	-	
SEr	Select serial communication protocol 0: CAREL protocol 9.6 kb/s 1: CAREL protocol 19.2 kb/s 2: Modbus 9.6 kb/s, even parity, 8 bits, 1 stop 3: Modbus 19.2 kb/s, even parity, 8 bits, 1 stop 4: Modbus 9.6 kb/s, no parity, 8 bits, 2 stop 5: Modbus 19.2 kb/s, no parity, 8 bits, 2 stop	0 to 5	1	-	
PS	Password for accessing the parameters Set to 0: no password is required. Set other than zero: the same value must be entered to access the parameters.	0 to 999	0	-	
FAC+ SET	Factory set Reset the default values (manufacturer) on the Instrument for the current mode.	no, yES	no	-	

Tab. 6.a



Note: the "+" symbol means that the parameter is shown on 2 fields.

